ISLAMIAH COLLEGE

(AUTONOMOUS)
VANIYAMBADI – 635 752

(AIDED & SELF FINANCE)

SYLLABI BOOK X

11TH ACADEMIC COUNCIL MEETING

(For the UG & PG Candidates Admitted from 2018-2019)

24Th JANUARY 2019

PAPER III, PROSE, HISTORY OF URDU LITERATURE & GENERAL ESSAYS

UNIT - I:
1. QISSA-E-HATIM TAI   --- Meer Amman Dehlavi
2. URDU ZUBAN KI IBTIDA AUR USKA IRTIQA
3. GENERAL ESSAY

UNIT II:
1. SIR SYED MARHOOM AUR URDU LITERATURE … Moulana Shibli Noumani
2. URDU KI IBTIDA KE BARE ME MUKTALIF NAZARIAT
3. SIR SYED AHMED KHAN

UNIT III:
1. NOOR JAHAN … Mohammed Hussain Azad
2. GHALIB
3. HALI

UNIT IV:
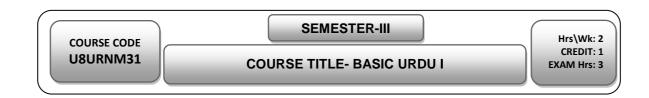1. KHANWADA-E-WALAJAHI KA EK GUMNAM SAH'ER-NAWAB MAHMOOD…Dr. Syed Sajjad Husain
2. IQBAL
3. FAIZ

UNIT IV:
1. MARHOOM KI YAAD MEIN
2. PREM CHAND
3. GENERAL ESSAY

BOOK PRESCRIBED:
1. FAIZAN-E-ADAB , APPLIED BOOKS, NEW DELHI
2. Guldasta-e-Mazameen-o-Insha Pardazi,
   Published by Educational Book House, Aligarh

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COURSE CODE U8URNM31	**SEMESTER-III** **COURSE TITLE- BASIC URDU I**	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

Unit I

Urdu alphabet, Reading & Writing practice in Urdu

Unit II

Word completion, Pronunciation, Connecting words.

Unit III
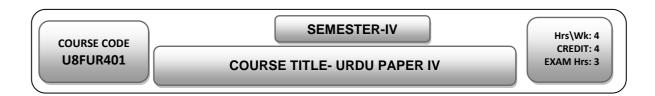
Vowels, Prepositions & Urdu Numerals.

Unit IV

Formation of Simple Sentences.
Names of flowers, fruits, birds, colours & Vegetables.

Unit V

Conversation & Urdu Calendar (Week days and Months).

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COURSE CODE U8FUR401	**SEMESTER-IV** **COURSE TITLE- URDU PAPER IV**	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

NON-DETAILED TEXT (SHORT-STORIES) & URDU DTP

UNIT - I:
1. KAFAN   --- Munshi Prem Chand
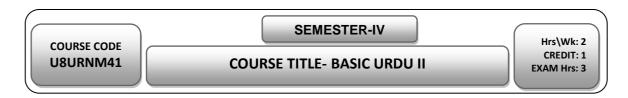2. NOOR O NAAR … Ali Abbas Hussaini
3. URDU DTP
UNIT II:
1. JAMUN KA PED … Krishan Chandar
2. KHUSH NASEEB.. Ali Akbar Amburi
3. URDU DTP
UNIT III:
1. RAHMAN KE JOTEY   ... Rajinder Singh Bedi
2. BARF GUZEDA LOG   ... Akbar Zahid
3. URDU DTP
UNIT V:
1. SAMJHOTA   …   Aabid safi
2. PANKHADIYAN GULAB KI. Rasheed Madrasi
3. URDU DTP

COURSE CODE U8URNM41	SEMESTER-IV COURSE TITLE- BASIC URDU II	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

Unit I

      Basics of Urdu Grammar

Unit II

      Names of flowers, fruits, birds, colours & Vegetables.
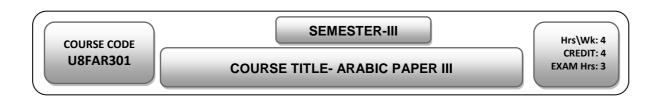
Unit III

      Composition (A short paragraph consisting of four or five simple sentences)

Unit IV

      Two simple poems.

Unit V

      Translation (Technical terms and a passage).

COURSE CODE U8FAR301	SEMESTER-III	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE- ARABIC PAPER III	

Prose and Translation

Syllabus:

Unit I – Lesson 1 & 2
         Hadith 51 to 55
Unit II – Lesson 3 & 4
         Hadith 56 to 60
Unit III – Lesson 5 & 6
         Hadith 61 to 65
Unit IV – Lesson 7 & 8
         Hadith 66 to 70
Unit V – Lesson 9 & 10
         Hadith 71 to 75

Books for study

1. Durus Al Lughat al arabia al-natigina biha Part II by
   Dr. V. Abdur Rahim, Director, Translation Centre, King Fahad Quran, Printing Complex, Madina
2. Hundred Hadith for good Generation by
   Dr. K. Mujeebur Rahman
   Assistant Prof. of Arabic, The New College, Chennai

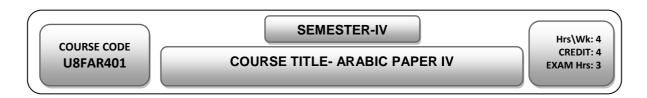| COURSE CODE U8ARNM31	SEMESTER-III	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3
	COURSE TITLE- BASIC ARABIC I	

Syllabus:

Unit I – Alphabet, The Vowels

Unit II – Sun Letters, Moon Letters, Definite and Indefinite

Unit III –, Arabic Numbers, singular, dual and plural

Unit IV – Word completion, Name of the flowers, fruits, colors, birds and vegetables.

 Unit V – Hijiri Calendar (week days & months)

COURSE CODE **U8FAR401**	**SEMESTER-IV** **COURSE TITLE- ARABIC PAPER IV**	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Prose and Translation

Syllabus:

Unit I –   Lesson 11 & 12
          Hadith 76 to 80
Unit II – Lesson 13 & 14
          Hadith 81 to 85
Unit III – Lesson 15 & 16
          Hadith 86 to 90
Unit IV – Lesson 17 & 18
          Hadith 91 to 95
Unit V –   Lesson 19 & 20
          Hadith 96 to 100

Books for study

1. Durus Al Lughat al arabia al-natigina biha Part II by
   Dr. V. Abdur Rahim, Director, Translation Centre, King Fahad Quran, Printing
   Complex, Madina
2. Hundred Hadith for good Generation by
   Dr. K. Mujeebur Rahman
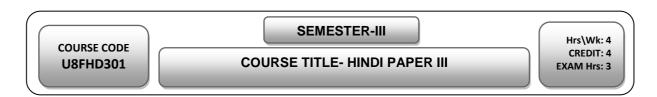
   Assistant Prof. of Arabic, The New College, Chennai

COURSE CODE **U8ARNM41**	**SEMESTER-IV** **COURSE TITLE- BASIC ARABIC II**	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

Unit I –   The Noun, Verb, Particles
Unit II –   Past Tense, Present and Future Tense, imperative and negative
          command
Unit III –   Preposition, the possessiveness
Unit IV –   Arabic to English (Translation)
Unit V –   English to Arabic (Translation)

OBJECTIVES:

1. To make the student able to appreciate ancient and Medieval Poetry and to identify the peculiarities of each period and understand the literary thoughts and styles of that period. 2. To develop an outlook about the History of Hindi literature through literary descriptions of three periods. 3. To make them able to critically evaluate the Novel prescribed for non detailed study.

SYLLABUS AND BOOKS PRESCRIBED :

I ANCIENT &MEDIEVAL POETRY :
       1. Kabir – Dohe   1 – 5 only *&* 1 Pad no.1
       2. Tulsidas - Dohe   1 – 6 only
       3. Rahim – Dohe   1 – 6 *only*
       4. Bihari – Dohe   1 – 6 only
       5. Thiruvalluvar - Kural   1 – 6 *only*

II UPANYAS : Daud *by* Mamta Kaliya (Non Detailed Study only)

III MUHAVARE AUR LOKOKTIYAN : Meanings Only
       (Prescribed Idioms and Proverbs Enclosed)

IV APPLIED GRAMMAR -: 1. Vaachya
              2. Kaal – no sub divisions
              3. Upasarg
              4. Pratyay
              5. Anek shabdon ke liye ek shabd.

V HISTORY OF HINDI LITERATURE : General Information about
       (Pramukh Visheshtayen) the First Three Periods:-
              1. Aadi kaal
              2. Bhakti Kaal
              3. Reeti Kaal

BOOKS FOR STUDY :
1. Sanrachna Kavya Sanchayan, Sanrachna Prakashan, Allahabad
2. Daud, Mamta Kaliya, Vaani Prakashan, New Delhi.

BOOKS FOR REFERENCE:
 1. Hindi Sahitya Ka Itihas, Ramchandra Shukla, Karvi Prakashan, Jaipur
 2. Hindi Sahitya Ka Ithihas, Dr. Nagendra, National Publishing
   House, New Delhi, 1973.
 3. Vyavaharik Hindi Vyakaran by Dr.Hardev Bahri, Lokbharathi
   Prakashan, Allahabad.
 4. Sampoorna Hindi Vyakaran, Sreesharan & Sri Alok Kumar Rastogi, Madhur, Books, Delhi.

THIRD SEMESTER – HINDI PAPER – III
PRESCRIBED IDIOMS AND PROVERBS

1 ईद का चाँद होना = दर्शन दुर्लभ होना / बहुत कम दिखाई देना। *मु.*

2 कोल्हू का बैल = बहुत अधिक परिश्रम करनेवाला। *मु.*

3 उल्टी गंगा बहाना = अनहोनी बात करना / प्रतिकूल बात करना। *मु.*

4 छाती पर मूंग दलना = सामने रहकर दुःख देते रहना। *मु.*

5 तीन तेरह करना = तितर बितर करना। *मु.*

6 टेढी खीर = मुश्किल काम। *मु.*

7 अंगूठा दिखाना = मना कर देना / तिरस्कार करना *मु.*

8 हाथ मलना = पछताना। *मु.*

9 दाँत खड़े करना = बुरी तरह हरा देना। *मु.*

10 रंगा सियार होना = कपटी होना ऊपर से कुछ अंदर से कुछ होना। *मु.*

11 गागर में सागर भरना = थोडे में बहुत कुछ कहना। *मु.*

12 कान का कच्चा = बात सुनकर तुरंत सच मान लेनेवाला। *मु.*

13 एक पंथ दो काज = एक समय में दो कार्यों की सिद्धि। *मु.*

14 नाक रगड़ना = दीनता दिखाना *मु.*

15 ऊँट के मुँह में जीरा = अधिक जरूरतवाले को थोड़ा देना। *मु.*

16 उल्टा चोर कोतवाल को डाँटे = दोष अपना और दूसरों को धमकाना। *लो.*

17 जिसकी लाठी उसकी भैंस = ताकतवर की जीत होती है। *लो.*

18 नीम हकीम खतरा जान = अधुरा ज्ञान भयंकर होता है। *लो.*

19 सांच को आंच क्या = सच्चे मनुष्य को कोई नहीं होता 1 *लो.*

20 एक अनार सौ बीमार = एक चीज और चाहनेवाले बहुत। *लो.*

21 धोबी का कुत्ता न घर का न घाट का = कहीं का न रहना। *लो.*

22 मन चंगा तो कठौती में गंगा = मन शुद्ध हो तो घर पर ही तीर्थाटन का फल। *लो.*

23 जैसा देश वैसा भेष = जहाँ रहें वहीं की रीतियों का आचरण करना। *लो.*

24 दूर के ढोल सुहावने = दूर के लोग या चीजें अच्छी मालूम पड़ना। *लो.*

25 खोदा पहाड़ निकली चुहिया = परिश्रम अधिक पर लाभ कम। *लो.*

Objectives: To introduce the Hindi language to students who never had it at school. The students in this level will experience Hindi for the first time and will enjoy learning basic sounds, words and expressions of Hindi language.

SYLLABUS

UNIT – I	VOWELS - CONSONANTS COMPOUND LETTERS BARAHKHADI NASAL SOUNDS – ANUSWAR – ANUNASIK
UNIT – II	NOUN - PRONOUN NAMES OF THE FRUITS, FLOWERS, BIRDS, ANIMALS, COLOURS – DAYS and NUMBERS 1 TO 20 ONLY
UNIT –III	USAGE OF का, की, के. USAGE OF CASE ENDINGS / PREPOSITIONS - ने, में, पर, से, को.
UNIT – IV	ROOT VERBS (20) IMPERATIVES – तू, तुम, आप ---- WITH VERBS INTERROGATIVES - WITH तू, तुम, आप
UNIT – V	PRESENT TENSE SIMPLE ONLY PRESENT CONTINUOUS TENSE

BOOKS FOR STUDY:

1. SARAL HINDI PARICHAY, D.B.H.PRACHAR SABHA, TRICHY.2015

BOOKS FOR REFERENCE:

1. SARAL HINDI BODHINI, D.B. H.PRACHAR SABHA, CHENNAI. 2011
2. TEACH YOUSELF HINDI, MOHINI RAO, HIND POCKET BOOKS, NEW
   DELHI. 2004

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COURSE CODE U8FHD401	SEMESTER-IV COURSE TITLE- HINDI PAPER IV	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objectives: **1.** *To make the students understand the development of modern Hindi Poetry.* *2. To acquaint them with the thoughts, ideas and ideologies of modern Hindi Poets. 3. Vigyapan & Computer Terminology in Hindi help them to face the challenges of Competitive world effectively.*

SYLLABUS AND BOOKS PRESCRIBED :

I.MODERN POETRY: 1. Yashoda – Uddhav Samvaad *by* Harioudh

2. Apna Sansar by Mythilisharan Gupta

3. Sukh - Dukh *by* Panth

4. Mera Jeevan by Subhadra Kumari Chouhan

5. Toota Pahiya *by* Dharmaveer Bharathi

II. VIGYAPAN: Paribhasha – Uddeshya – Mahatwa /

Upayogita – Prakar – Vigyapan ki Bhasha

III. LNGUAGE &APPLIED GRAMMAR:

1. Shuddh Keejiye

2. Tatsam to Tatbhav   & Vice versa

IV. SUCHNA PROUDYOGIKI AUR HINDI:

I.T. me Hindi ka Vikas (parichay) – Unicode fonts

– Hindi tankan – Lipyantaran – Terminology.

(Prescribed terms from English to Hindi)

V. HISTORY OF HINDI LITERATURE - ADHUNIK KAAL:

General information about the prescribed poets /

Writers from Modern Period 1 Agneya   2. Dinkar

3. Mannu Bhandari 4. Dhoomil 5. Krishna Sobthi.

BOOKS FOR STUDY :
   1.   Sanrachna Kavya Sanchayan, Sanrachna Prakashan, Allahabad -1.

BOOKS FOR REFERENCE :
  1. Vyavaharik Hindi Vyakaran *by* Dr.Hardev Bahri, Lokbharathi   Prakashan, Allahabad.
  2. Rachna Rashmi 1 & 2, Vinod Pustak Mandir, Agra - 2
  3. Hindi Bhasha aur Nagari Lipi, Bholanath Tiwari, Lokbharati, Allahabad
  4. Hindi sahitya ka Ithihas, Dr. Nagendra, National Publishing House, New Delhi - 1973.
  5. Vigyapan: Bhasha aur Sanrachna, Dr.Rekha Sethi, Vani Prakashan, New Delhi. 6. Suchna Proudyogiki Aur Internet, Dr. Shankar Singh, Poorvanchal Prakashan, Delhi - 94

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FOURTH SEMESTER – HINDI
Prescribed Computer / IT / Internet Terminology from English to Hindi -

Access = अभिगम

Automation = स्वचालन

Axis = धुरी/ अक्ष

Binary = द्विपदी/ द्विआधारी

Bad Sector = अनुपयोगी खंड

Browser = विचरक

Coding = कूट लेखन

Circuit = परिपथ

Component = घटक

Central Memory = केन्द्रीय स्मृति

Ctrl. = नियंत्रण

Data = तथ्य / आंकड़ा

Database = आंकड़ा आधार

Digital = अंकीय

Home Page = मुख पृष्ठ / पहला पन्ना

Input = निवेश

Internet = अंतरजाल

Key Board = कुंजीपटल

Log in = सत्रारंभ

Network = जाल तंत्र

Operating System = प्रचालन तंत्र

Password = कूट शब्द

Voice Mail = वाक् डाक

Word Processor = शब्द संसाधक

Storage = भंडारण

Text = लेखन

Netizen = जालवासी

Web server = वेब परिसेवक

WWW = विश्वव्यापी वेब

ZIP = संकुचित

| COURSE CODE U8HDNM41 | COURSE TITLE- NON MAJOR – BASIC HINDI - II | Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3 |

Objectives: To continue to develop and enhance students' introductory level toward a higher level of reading, writing and translation skills in Hindi.

SYLLABUS:

UNIT – I   FUTURE TENSE
           ADJECTIVES (अच्छा, बुरा, मीठा, खट्टा ...)

UNIT - II   PAST TENSE
           SIMPLE PAST TENSE WITHOUT **'nao'**
           NUMBER

UNIT –III   SIMPLE PAST TENSE WITH 'nao'
           GENDER

UNIT –IV   TRANSLATION PRACTICE
           SIMPLE SENTENCES
           ENGLISH TO HINDI

UNIT –V   TRANSLATION PRACTICE
           SIMPLE SENTENCES
           HINDI TO ENGLISH

BOOK FOR STUDY:

1. SARAL HINDI PARICHAY, D.B.H.PRACHAR SABHA, TRICHY.2015
2. SARAL HINDI BODHINI, D.B.H.PRACHAR SABHA, CHENNAI, 2011

BOOK FOR REFERENCE:

1. HINDI PRAYOG, PART – I, D.B.H.PRACHAR SABHA, CHENNAI, 2005
2. NAYEE HINDI RACHNA- PART – II, D.B.HINDI PRACHAR
   SABHA, CHENNAI, 2008
3. ANUVAD ABHYAS – I, D.B.HINDI PRACHARSABHA, CHENNAI,2009

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COURSE CODE
U8FTA301

COURSE TITLE- TAMIL PAPER III

Hrs\Wk: 4
CREDIT: 4
EXAM Hrs: 3

Objectives:

மாணவர்களிடையே படைப்பாற்றலை ஊக்கப்படுத்தவும், எதிர்காலத்தில் தன்னம்பிக்கையோடு வாழ்க்கையை மேம்படுத்தவும், அன்றாட வாழ்வில் பிழையின்றி பேசவும், எழுதவும் மற்றும் பல்வேறு செய்திகளை மாணவர்களுக்கு வழங்குவதே இப்பாடத்தின் முதன்மையான நோக்கமாகும்.

அலகு 1: கவிதை

பாரதியார் கவிதை - குயில் பாட்டு
குயில், குயில் பாட்டு, குயிலின் காதல் கதை
பாரதிதாசன் - குடும்ப விளக்கு
வேடப்பனுக்கு மீண்டும் வாய்ப்பு
கவிமணி தேசிக விநாயகம் பிள்ளை - திருக்குறள் இன்பம்
முனைவர் ப.சிவராஜி - அப்துல் கலாம் கவிதை

அலகு 2: சிறுகதை

1.மேல்பார்வை- தண்ணீர்- சுந்தர ராமசாமி
2.வளையாத பனைகள்- முனைவர் இரா.நந்தகோபால்
3.இராட்சஸம்- முனைவர் சையத் அப்துல் ரகுமான்

அலகு 3: உரைநடை

1.தன்னம்பிக்கை முன்னேற்றத்தின் முதல் படி- சிவசூரியன்
2.தன்னம்பிக்கைக் கட்டுரை- முனைவர் பி.கே.மனோகரன்
3.படிப்பு சுமையல்ல சுகம்- பசுமைகுமார்

அலகு 4: நாடகம்

வேலைக்காரி- பேரறிஞர் சி.என்.அண்ணாதுரை

அலகு 5: மொழித்திறன், இலக்கிய வரலாறு

சந்திப்பிழை நீக்குதல்
ஒருமை, பன்மை பிழை நீக்குதல்
மரபுப்பிழைகள்
பிறமொழிச் சொற்களை நீக்குதல்
ஒலி வேறுபாடறிந்து சரியான பொருளை அறிதல்
அகர வரிசைப் படுத்துதல்
இக்கால இலக்கிய வரலாறு
கவிதை, சிறுகதை, புதினம், உரைநடை

<table>
<tr><td rowspan="3">COURSE CODE
U8TANM31</td><td>SEMESTER-III</td><td rowspan="3">Hrs\Wk: 2
CREDIT: 1
EXAM Hrs: 3</td></tr>
<tr><td>COURSE TITLE- ARIVIYAL TAMIL-I</td></tr>
</table>

Objectives:

மாணவர்களிடையே அறிவியல் தமிழை அறிமுகம் செய்தல் தமிழிலக்கியங்களில் பயின்று வரும் அறிவியல் சிந்தனையை எடுத்துரைத்தல். அறிவியல் தமிழ்நூல்களை அறிமுகம் செய்தல், சுற்றுப்புறச்சூழலை எடுத்துரைத்தல்.

அலகு 1 **அறிவியல் தமிழ் அறிமுகம்**
                     வ.செ. குழந்தைசாமி

அலகு 2 **காலம் தோறும் தமிழ்**
                     முனைவர் திருமதி இராதா செல்லப்பன்

அலகு 3 **தமிழில் அறிவியல்**
                     மணவை முஸ்தபா

அலகு 4 **அறிவியல் தமிழ் நூல்கள்**
                     மணவை முஸ்தபா

அலகு 5 **பழந்தமிழரும் சுற்றுச்சூழலும்**
                     முனைவர் த. தெய்வீகன்

<table>
<tr><td rowspan="3">COURSE CODE
U8FTA401</td><td>SEMESTER-IV</td><td rowspan="3">Hrs\Wk: 4
CREDIT: 4
EXAM Hrs: 3</td></tr>
<tr><td>COURSE TITLE- TAMIL PAPER IV</td></tr>
</table>

Objectives:

மாணவர்களிடையே சமயங்களின் வாயிலாக பக்தியுணர்வை அறியச் செய்வதும், இலக்கியங்கள் வெளிப்படுத்தும் கருத்துக்களை எடுத்துரைப்பதும், மொழிப் பயன்பாடு மற்றும் அன்றாட வாழ்வில் பின்பற்றப்பட வேண்டிய நெறிமுறைகளையும் மாணவர்களுக்கு வழங்குவதே இப்பாடத்தின் முதன்மையான நோக்கமாகும்.

அலகு 1: பக்தி இலக்கியங்கள்

திருவெம்பாவை- மாணிக்கவாசகர் (6 பாடல்கள்)
பெருமாள் திருமொழி- குலசேகராழ்வார் (5 பாடல்கள்)
சீறாப்புராணம்- உமறுப்புலவர் (தொழுகை வந்த வரலாற்றுப்படலம்)
திருக்காவலூர்க் கலம்பகம்- வீரமாமுனிவர் (5 பாடல்கள்)

அலகு 2: சிற்றிலக்கியங்கள்

முக்கூடற்பள்ளு (5 பாடல்கள்)
தமிழ்விடுதூது (20 பாடல்கள்)
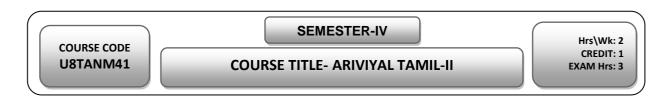ஆயி'ர நாச்சியார் பிள்ளைத்தமிழ் வருகைப் பருவம் கவி.கா.மு.ெ'ரிப்

அலகு 3:

உலகை மாற்றிய காந்தியின் பயணம் - ஆசை
இந்து தமிழ் நாளிதழ் 19-12-2018 ப.17
பணிப்பண்பாடு- வெ.இறையன்பு
சத்தியசோதனை- அன்பின் உழைப்பு வீணா?

அலகு 4:

இசுலாமியத் தமிழ்ச் சிற்றிலக்கியங்கள்
உன்னை வெல்க- அப்துல் ரஹீம்

அலகு 5: மொழித்திறன், இலக்கிய வரலாறு

ஒரெழுத்து ஒரு மொழி
தொடரும் தொடர்பும் அறிதல்
அடைமொழியால் குறிக்கப்பெறும் நூல்
நூல் மதிப்பீடு
அறிக்கை தயாரித்தல்
மொழிநடை- அ.கி.பரந்தாமனார்-
இலக்கிய வரலாறு
பக்தி இலக்கியம், சிற்றிலக்கியம், நாடகம்

COURSE CODE U8TANM41	SEMESTER-IV COURSE TITLE- ARIVIYAL TAMIL-II	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

Objectives:

மாணவர்களிடையே அறிவியல் இலக்கியத்தை அறிமுகம் செய்தல், அறிவியல் தமிழின் விடிவெள்ளியாகத் திகழும் மணவை முஸ்தபா அவர்களை அறிமுகம் செய்தல். பாரதியின் அறிவியல் தமிழ்ச் சிந்தனைகளை எடுத்துரைத்தல். தமிழில் அறிவியல் இலக்கியத்தையும், மணவையாரின் சிந்தனையையும் எடுத்துரைத்தல்.

அலகு 1.   **அறிவியல் இலக்கியம்**
           மணவை முஸ்தபா

அலகு 2.   **பாரதியும் அறிவியல் தமிழும்**
           இராம.சுந்தரம்

அலகு 3.   **அறிவியல் தமிழ் வளர்ச்சி நிலைகள்**
           அன்பு சிவா

அலகு 4.   **தமிழில் அறிவியல் இலக்கியமும் மணவையார் சிந்தனையும்**
           இராம் குமார்

அலகு 5.   **தமிழ் மொழியில் அறிவியல் சிந்தனைகள்**
           மு.குணசேகரன்

OBJECTIVE:
The prime objective of this paper is to promote the linguistics competence into theminds of the young learners through teaching the basics of English and acquainting them with situational dialogues and expose the learners to the production and receptive skills.

UNIT-I   SHORT STORIES

1.   THE LAST LEAF
       O. Henry
2.   THE CABULIWALLAH
       RabindranathTagore

UNIT-II   SHORTBIOGRAPHIES

1.   R.K.NARAYAN
2.   Dr. S.RADHAKRISHNAN

UNIT-III   COMMUNICATIONSKILLS

1.   SOUNDS ANDSYMBOLS
2.   WORDS AND PHRASES TO TALK ABOUTPOSSIBILITIES
3.   ASKING THESCHEDULE
4.   TELLING THETIME
5.   MEETING AND GREETINGPEOPLE
6.   TELEPHONE ETIQUETTE

UNIT-IV   GRAMMAR

1.   SUBJECT ANDPREDICATE
2.   DEGREES OFCOMPARISION
3.   RELATIVE CLAUSES: with *who, which* and *that*
4.   RELATIVE CLAUSES:*whose*
5.   RELATIVE CLAUSES: often subjects of mainclauses

UNIT-V   WRITINGESSAYS

1.   PART- TIMEJOBS
2.   THEINTERVIEW
3.   CHILDLABOUR
4.   THE USES AND ABUSES OFADVERTISEMENT
5.   GLOBALWARMING
6.   HUMANRIGHTS
7.   THE EVILS OF DOWRYSYSTEM
8.   WHEN CHARACTER IS LOST, EVERTHING ISLOST

Books for study:
TEXT BOOK: 1. Foundation English for Semester III – published by
                   Islamiah
                         College (Autonomous), Vaniyambadi.

Objective
    The prime objective of this paper is to promote the linguistics competence into the minds of the young learners through teaching the basics of English and acquainting them with situational dialogues and expose the learners to the production and receptiveskills.

UNIT-I   SHORTSTORIES
1. WITH THE PHOTOGRAPHER
    StephenLeacock
2. THE WORLD-RENOWNEDNOSE
    VaikomMuhammedBasheer

UNIT-II   SHORTBIOGRAPHIES
1. A.P.J. ABDULKALAM
2. STEVEJOBS

UNIT-III   COMMUNICATIONSKILLS
Conversational Etiquette
1. Formal Communication
2. InformalCommunication
3. Semi-Formal Communication
4. GroupDiscussions

UNIT-IV   GRAMMAR
1. JUMBLEDLETTERS
2. ACTIVE AND PASSIVEVOICE:
    Tenses And
    Agreement
    Verb with
    Two
    Objects Use
    Of 'It'.
3. DIRECT AND INDIRECT SPEECH: Positive And Negative Statement AndQuestions
4. MODALS:
    Positive and Negative Questions
5. ADVERBIALCLAUSES

UNIT-V WRITING
1. PREPARING ARESUME'
2. JOB COVERLETTER
3. TIPS FOR PREPARING JOBINTERVIEW
4. LISTENING TO AND ANSWERINGINTERVIEW
5. THINGS TO BE PREPARED BEFORE THEINTERVIEW
6. THINGS TO CARRY FOR THEINTERVIEW
7. FREQUENTLY ASKED QUESTIONS

Books for Study: Foundation English for Semester IV –
published by Islamiah College (Autonomous), Vaniyambadi.

COURSE CODE **U8EN3001**	**SEMESTER-III** **COURSE TITLE- ENGLISH POETRY**	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

OBJECTIVE:
- *To enhance the learners to comprehend different themes, period in which it has written and the techniques applied by listedpoets.*
- *To enhance the learner how the figurative language is used as medium to set the tone.*
- *To make the students reflect upon the creative process of any twoworks.*

UNIT-I
JohnMilton   - On His
Blindness WilliamWordsworth   -
Daffodils
                   -The Solitary Reaper

UNIT-II
JohnKeats   -Ode on a GrecianUrn
RobertBrowning   -The Last RideTogether

UNIT-III
Alfred LordTennyson   -Ulysses

UNIT-IV
MatthewArnold   -DoverBeach

UNIT-V
W.B.Yeats   -Sailing toByzantium

URLs

1.*http://study.com/academy/lesson/on-his-blindness-summary-theme-analysis.html 2.http://www.enotes.com/topics/on-his-blindness*

3.https://beamingnotes.com/2013/05/21/summary-and-analysis-of-daffodils-by- william-wordsworth/
4.http://www.sparknotes.com/poetry/keats/section4.rhtml
5.http://www.victorianweb.org/authors/arnold/touche4.html
6.http://literatureguides.weebly.com/analysis-of-daffodils-by-william- wordsworth.html

COURSE CODE U8EN3002	SEMESTER-III COURSE TITLE- SHAKESPEARE	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

UNIT-I & II
    Merchant of Venice

UNIT-III & IV
    Macbeth

UNIT-V
    Sonnets (17&18)

    URLs
    Unit-1&II-

      1.http://www.sparknotes.com/shakespeare/merchant/2.http://www.cliffsnotes.co m/literature/m/the-merchant-of-venice/play-summary

    Unit-III&IV   1.http://www.cliffsnotes.com/literature/m/macbeth/play-summary
              2.http://www.enotes.com/topics/macbeth

    Unit-V   1.http://www.shmoop.com/sonnet-17-neruda/summary.html
              2.http://www.shmoop.com/sonnet-18/section-1-lines-1-8-summary.html
              3.http://www.gradesaver.com/shakespeares-sonnets/study-guide/summary-sonnet-18-shall-i-compare-thee-to-a-summers-day

- *To picture the evolution from Old English (450-1100 AD), Middle English (1100-circa 1500 AD) to Modern English (since1500).*
- *To portrait the words that has been passed up till now, coined byRoman merchants' andsoldiers.*
- *To paint the idea of what life was like in fourteenthcentury.*

UNIT-I

The Indo-European Family of Languages

UNIT-II

Influence of Shakespeare on the English Language

UNIT-III

Change of Meaning in English Language vocabulary Growth

UNIT-IV

The Evolution of Standard English

UNIT-V

Indian Loan Words in English URLs

1. https://en.wikipedia.org/wiki/History_of_the_English_language_%28educ ation%29 2. http://www.studyenglishtoday.net/english-language-history.html3.http://www.open.edu/openlearn/languages/english-language/the-   history-english-ten-minutes

COURSE CODE U8ENAL32	SEMESTER-III COURSE TITLE- ALLIED- ENGLISH FOR COMMUNICATION	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

OBJECTIVE:

- *To teach how pre-read and scan the academic materials to get itsmeaning.*
- *To teach the writer's purpose of setting the tone in thecontext.*
- *To enable him to synthesize the ideas from what they havecomprehended.*

UNIT-I

1. The importance ofcommunication
2. Interpersonalcommunication

UNIT – II
1. Body language

UNIT - III
1. Dealing withpeople
2. Helping people to likeyou

UNIT-IV
1. Meeting   2. Preparation
3. Content

UNIT -V
1. The Role of VisualAids
2. Appearance andAttitude
3. Developing GoodHabits
4. Giving up BadHabits
5. Overcoming nervousness andTension
6. Delivery
7. Audience

Books for study:
    DR.K.M.PRABU--SKILLSFORCOMMUNICATIONANDPRESENTATION‖

URL
1.http://www.myenglishpages.com/site_php_files/speaking.php

OBJECTIVE:
- *To set an aim to reflect an individual's personality through the language development*
- *To enable learners to have deeper understanding of meaning from thecontext.*
- *To teach the 44 sounds of 26 Englishalphabets.*

Unit – I

1. Objectives of teaching English
2. Bloom's Taxonomy of EducationalObjectives

Unit – II
1. Interference and transfer from the mothertongue
2. Listening activities – dictation, following a route, listening to instructions, jigsawlistening.
3. Techniques in teachingspeaking
4. Barriers of effective communication

Unit – III
1. Bilingualmethod
2. Directmethod
3. The audio lingualmethod
4. Structuralapproach
5. Oralapproach
6. Eclecticapproach

Unit – IV
1. Using News media in ELTClassroom
2. Teaching English Intonation to ESL/EFLstudents

Unit- V

1. Characteristics of good handwriting
2. Developing goodhandwriting
3. Planning and Design in Teaching and Learning 4.Changing roles of aTeacher

Book for Study: 1.Dr. S.V. Shrangare, English Language Teaching,2011

COURSE CODE **U8EN4002**	**SEMESTER-IV**	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3
	COURSE TITLE- AMERICAN LITERATURE I	

OBJECTIVE:

- *To create an awareness of historical, cultural and formal issues.*
- *To make learner to compete with complex literarytexts.*
- *To make learners to use them as primary and secondarysources.*

UNIT-I (PROSE)
RalphWaldo Emerson   -Self Reliance

UNIT-II (POETRY)
EmilyDickinson   -Because I Could Not Stop forDeath
EdgarAllenPoe   -TheRaven

UNIT-III (POETRY)
RobertFrost   -Birches
e.e.cummings   -The CambridgeLadies

UNIT-IV (DRAMA)
TennesseWilliams   -Glass Menagerie

UNIT-V (NOVEL)
ErnestHemingway   -The Old Man and theSea

URLs:
1.http://www.mrgunnar.net/ap.cfmsubpage=3483712.http://www.c
liffsnotes. com/literature/g/the-glass-menagerie/play-summary
3.http://www.sparknotes.com/lit/oldman/
4.http://www.cs.cmu.edu/~spok/metabook/thirst.html

OBJECTIVE:
   a. *It focuses on the traditional values that have attracted people to the United States for well over 200 years and traces the effects of these values on Americanlife.*
   b. *It helps the readers to compare their traditional values, freedom, cultural diversity and equal opportunity with those themes in the fiveunits.*
   c. *It helps to develop the reading skills, to compare and contrast, building their vocabulary and other languageaspects.*

UNIT I

Understanding the culture of United States - A nation of immigrants – Cultural Pluralism

UNIT II

American's traditional values, religious and cultural diversity

UNIT III

Individual freedom and self-reliance

UNIT IV

The American Religious Heritage

UNIT V
Equality of Opportunity and Competition

Book for Study:
Maryanne Kearny Datesman, Joann Crandall and Edward N. Kearny, American Ways, Longman, 2005.

COURSE CODE **U8ENAL42**	**SEMESTER-IV** **COURSE TITLE- ALLIED-COMPUTER LITERACY**	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

OBJECTIVE:

It is more evident that the fresher who seek job opportunity must primarily possess the computer skill. In order to run the business more effectively and promising and to share the data worldwide the employer expects basic computer literacy tocommunicate.

Unit I

About Windows – My Computer – My documents – Recycle Bin – Wall Paper – Screen Saver - Time and Data – Windows Accessories – Resizing and Moving a Window

Unit II

Formatting in MS Word – Formatting the text – Text Effects – Aligning the text – Applying Border and Shading – Adding Bullets and Numbering

Unit III

Microsoft Office PowerPoint
– Starting – Title Bar – Ribbon – Quick Access Tool Bar – Slides/Outline Pane – Creating a new presentation –Inserting Slides – Saving – Slide show – Closing the Presentation – Opening a saved file
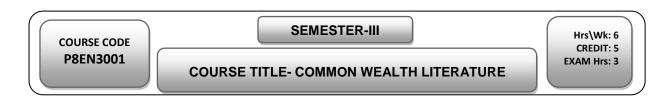
Unit IV
Microsoft Office Publisher
-to create Newsletters, Web Page, Poster, Chart and Certificate

Unit V
Apps [Applications] – Vocaroo – Skype – Blogging – Podcast

Reference Book
Peter Norton- Introduction to Computers 2009 7th Ed, TMH Publication

COURSE CODE P8EN3001	SEMESTER-III	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3
	COURSE TITLE- COMMON WEALTH LITERATURE	

Objective: To acquaint the students in overlapping fields of commonwealth Literature, Postcolonial Literature and New Literatures in English.

UNIT – I   POETRY

Australia – Judith Wright	Fire at Murdering Hut
England - P.K. Page	Adolescence
New Zealand - Jessie Mackay	The Noosing of the Sun-God

UNIT – II   SHORT STORY

Caribbean- KevinJavedHosein	Passage
Pacific – Jenny Bennett Tuionetoa	Matalasi

UNIT – III   PROSE

INDIA – M.K.GANDHI	The Story of My Experiments with Truth

UNIT – 1V   DRAMA

Nigeria – Wole Soyinka	The Lion and the Jewel

UNIT – V   FICTION

Nigeria – Chinua Achebe	Things Fall Apart
Canada- Margaret Atwood	Surfacing

REFERENCES

Margaret J.O'Donnell. An Anthology of Commonwealth Verse, Madras: Blackie.

C.D. Narasimhaiah. An Anthology of Commonwealth Poetry, Madras: Macmillan

COURSE CODE
P8EN3002

COURSE TITLE- LITERARY THEORY AND CRITICISM I

Hrs\Wk: 6
CREDIT: 5
EXAM Hrs: 3

Objective: To expose the learners to the elements of literature and classical criticism.

UNIT – I

    (i)   Introduction to Literary Criticism (Aristotle and Horace)
    (ii)   Book: A Background to the study of English Literature – B.Prasasd

UNIT – II

Johnson	Preface to Shakespeare
Wordsworth	Preface to the Lyrical Ballads

UNIT – III

Arnold	Study of Poetry
T.S.Eliot	Tradition and Individual Talent

UNIT – IV

Elaine Showalter	towards Feminist Poetics

UNIT – V

N.Frye	Archetypes of Literature

Reference Books:

1. Literary Criticism: Seetharama, Macmillan Publishers. (Unit III & IV)
2. Postmodernism for Beginners (Unit V)

COURSE CODE P8EN3003	SEMESTER-III	Hrs\Wk: 6
	COURSE TITLE- ENGLISH LANGUAGE TEACHING	CREDIT: 4 EXAM Hrs: 3

Objective: To acquaint the learners with the theories and practices of teaching English.

UNIT-I

English Language Teaching in India

UNIT- II

Psychology of Language Learning

Theories of Language Learning

Cognitive-Code

Behavior theory

First Language acquisition and Second Language learning

UNIT- III

Methods and approaches in teaching English

Translation methods – Direct Method – Bilingual Method – Structural approach – Situational approach – Eclectic approach

UNIT- IV

Curriculum Design

Modern concept of Curriculum – Curriculum and Education – Need and the importance of Curriculum – Types of Curriculum

UNIT- V

Audio – Visual Teaching aids in ELT – importance of teaching aids – charts and tables – flash cards – cue sheets – language laboratory

REFERENCES

Howall A.P.R. A History of English Language Teaching, OUP, 1984

Richards, J and Rudgers, S. Approaches and Methods in Language Teaching, CambridgeUniversity Press, 2001

David Nunan, Language Teaching Methodology, Prentice Hall, 1991

COURSE CODE P8EN3004	COURSE TITLE- CONTEMPORARY LITERARY THEORIES	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objective: To familiarize the students with modern literature and criticism.

UNIT – I

Jacques Derrida- Structure, Sign and Play in the Discourse of Human Sciences

UNIT – II

Sigmund Freud: Interpretation of Dreams

Stanley Fish: Is there a text in this Class?

UNIT – III

Stephen Greenblatt Shakespeare and the Exorcists

UNIT – 1V

Louis Althusser: Ideology and Ideological State Appararuses

UNIT – V-

AniaLoombaa: Situating Colonial and Post Colonial Studies

John Fiske: Culture, Ideology, Interpellation

REFERENCES

Literary Theory: An Anthology II ed. Julie Rivikin and Michael Ryan. Australia: Blackwell Publishing Ltd. 1998

The English Critical Tradition Vol.1 and 2. Ed. S.Ramasami and V.S.Sethuraman. Macmillan: Chennai 1978

Contemporary Criticism: An Anthology, Ed. V.S. Sethuraman. Macmillan: Chennai 1989

COURSE CODE P8ENEP31	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE- TECHNICAL WRITING	

Objective: To familiarize the learners in creating meaningful documents for different technical situations.

UNIT I

Definition and Concept of Technical Writing

UNIT II

Writing Process – Prewriting, Writing and Rewriting; the Rationale; the Process; Writing Effective Sentences; Structure of a Paragraph; Writing Effective Paragraphs

UNIT III

Instructions and User Manuals; Writing Summaries, Reports and Proposals

Writing different kinds of letters, memos, CV, E-mail communication, Presentation

UNIT IV

Technical Writing Today, Case Studies, Designs and Layout, Computer Skills, Production

UNIT V

Mini-Project

REFERENCES

Communication Skills for Technical Students T.M. Farhatullah: Orient Longman, Chennai, 2002
Science and Technical Writing: A Manual of Style, Philip Rubens. RoutledgeNY, 2004

Writing Remedies: Practical Exercises for Technical Writing EdmundH Weiss,

HyderabadUniversity Press, 1990

COURSE CODE P8ENEP32	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE- RESEARCH METHODOLOGY	

Objectives: To introduce the students to the concept of research and to enable them to understand the stages of research. To familiarize the learners to the procedures involved in research and to sensitize them to the requirements of cohesion and coherence in continuous composition

Unit-I- Meaning and Nature of Research

What is research? Objectives of Research - fundamentals of Research -Characteristics of Research- Types of research -Qualities of a Good Researcher

Unit II: Materials and Tools of Research

Primary and Secondary sources Books, Anthologies, Biographies, Thesauruses, Encyclopedia, Conference proceedings, Unpublished theses, Newspaper articles, Journals, e-journals, Monographs, Translations, Web references, Library catalogues, Literature Resource Center, Govt. publications, Special libraries, Advanced study centers, Virtual libraries, Web search engines

Unit-III: Research in Literature and Language

Literary research and research in other Disciplines Literary research-Interpretative, Theoretical, Biographical etc Research methods in Linguistics Research methods in Literature How research in language is different from research in literature emerging areas of research in language and literature Use of literary and linguistic theories in research

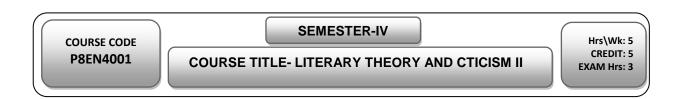## Unit-IV: Methods and Techniques of Research

Research Methods vs. Research Methodology Variants in Methodology Types of methods: Statistical, Sampling, Applied, Case study, Survey, Interpretative, Experimentation, Interviews, Questionnaire etc Evaluation of different methods: Historic, Comparative, Descriptive, Scientific

Unit V: Presentation of Research

Format of the Thesis, Language of the thesis, Logical Writing Language and style of the thesis, Introductions and conclusions; Presentation of findings Suggestions for future research; Writing a Short Research Paper

References:
1. Hunt, Andy (2005), Your Research Project, New Delhi: Foundation Books
2. Abdul Rahim, F. (2005), Thesis Writing: A Manual for Researchers (New Delhi: New Age International)
3. Gibaldi, Joseph (6th edn. 2003), MLA Handbook for Writers of Research Papers,New York: MLA Association
4. Eliot, Simon and W. R. Owens (4thedn. 1998), A Handbook to Literary Research, London: Routledge & Open University

COURSE CODE P8EN4001	SEMESTER-IV	Hrs\Wk: 5
	COURSE TITLE- LITERARY THEORY AND CTICISM II	CREDIT: 5 EXAM Hrs: 3

Objective: To expose the learners to the elements of literature and classical criticism.

UNIT – I

Lionel Trilling   Sense of the Past

Cleanth Brooks   The Language of Paradox

UNIT – II

Georg Lukacs   Ideology of Modernism

UNIT – III

Jacques Lacan   Of Structure As An Inmixing of an Otherness Prerequisite to
     any Subject Whatever

UNIT – IV

Said   From Orientalism- Extract in Modern Criticism And Theory

UNIT – V

Barthes   Death of the Author

Foucault   From Archeology Of Knowledge

Reference Books:

Theory of Criticism: David Lodge
20th Century Reader: David Lodge

COURSE CODE **P8EN4002**	**SEMESTER-IV** **COURSE TITLE- SOFT SKILLS**	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

UNIT – I

Communication - Body language, facial expression, humor, eye contact, tone of voice, etiquette

UNIT – II

Empathy **-** Honesty, cultural diversity, ability to take other's point of view, integrating Cognitive and affective skills

UNIT – III

Intrapersonal **-** Self-management, self-esteem, self-awareness, self-regulation, self-critique

UNIT-IV

Interpersonal - Team work, persuasion, negotiation, conflict resolution, Reading social situations, learning to say no, active listening

UNIT – V

Leadership - Critical, lateral, strategic thinking, delegation, taking responsibility, giving praise, appreciation, giving and receiving feedback, ability to motivate, problem solving.

REFERENCES

Working with Emotional Intelligence. Daniel Coleman.

How to Develop Self Confidence and Influence People by Public Speaking. Dale Carnegie.

[Unit I- Body Language: Alan Pease]

UNIT-I

Introduction to Journalism and Mass Communication - Growth of Journalism and its impact on society - Radio Journalism - T.V journalism- Growth, Impact, Merits and Demerits

UNIT-2

Introduction to Journalism and Mass Communication - Print Journalism - Role of Cinema as a Mass Medium - Investigative Journalism

UNIT-3

Newspaper Organization - Reporting: Ethics of Good Reporting, T.V. Reporting, Radio Reporting etc. - Feature Writing: Economic, Politics, Sports etc. -Editing, Organization and Presentation - Presenting Book Reviews

UNIT-4

Aspects of communicative Studies - Definition of Communicative Studies - Communicative Terms and Principles- Communicative Purpose and Setting

UNIT-5

Communicative Skills – Skimming – Scanning – Referencing – Coding – Decoding - Transcoding - Advertising

REFERENCE BOOKS

Mass Communication and Journalism in India, D.S. Mehta

Theory and Practice of Journalism, B.M.Ahuja

News Reporting and Editing-K.M. Shrivastava: Sterling Publishers. Bangalore 1987.

UNIT I POETRY

Elizabeth Barret Browning A Dead Rose

Sylvia Plath   Blackberrying

Maya Angelou   I Know Why The Caged Bird Sings

Kamala Das   An Introduction

UNIT II   PROSE

Virginia Woolf   A Room of One's Own

Arundhathi Roy   How deep shall we dig?

UNIT III DRAMA

MahaSweta Devi   Mother of 1084

Caryll Churchill   Serious Money

UNIT IV FICTION

JhumpaLahiri   The Namesake

Margaret Atwood   The Handmaid's Tale

UNIT V GENERAL

Mary Wollstone Craft   A vindication of the Rights of women

Elaine Showalter   A literature of their own

COURSE CODE P8ENEP41	SEMESTER-IV COURSE TITLE- ANATOMY OF LITERATURE	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

UNIT I: THE ANATOMY OF PROSE

The form of prose – vocabulary – grammar and idiom written and spoken prose – the paragraph – prose rhythm - individual and common style – simplicity and ornamentation – objective and subjective – abstract and concrete – realism, romance and unreality – special inventions – prose for its own sake – the historical approach – the science of rhetoric – writing prose

UNIT II: THE ANATOMY OF POETRY

The importance of form – physical form of poetry – meter – variation –rhyme – onomatopoeia – internal pattern – form in intonation – repetition – main types of poetry – logical sequence – use of associations – patterns of imagery – traditional verse forms – free verse – choice of words – illustrations – cautions – twentieth century techniques

UNIT III: THE ANATOMY OF NOVEL

The concept of fiction – verisimilitude – point of view – plot – character – character revealed – conversation – scene and background – dominant themes – experimentation

UNIT IV: THE ANATOMY OF DRAMA

Live literature –action –plots – conventional categories – direct experience of characters – dialogue and conversation – verse and plot – types of drama – drama and history – use of notes – interpretation

UNIT V: LITERARY RESEARCH

Research and Writing – mechanics of writing – format of research paper – documentation: preparing the list of works cited – citing sources in the text – abbreviations
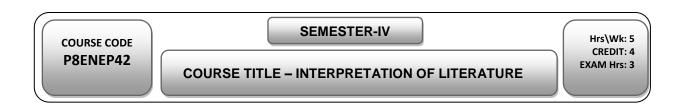
Reference:

Marjorie Boulton, The Anatomy of Prose (1954)

Marjorie Boulton, The Anatomy of Poetry (1953)

Marjorie Boulton, The Anatomy of Novel

Marjorie Boulton, The Anatomy of Drama (1960)

Joseph Gibaldi, MLA Handbook for Writers of Research Papers, 6th Edition

OBJECTIVES: The paper will discuss the various genres in literature to kindle the concept of the text and canon. It will help students to read and interpret the texts by making use of various theoretical concepts like feminism, ecocriticism, etc.,

UNIT I: INTRODUCTION
What Is Literature?
Major Literary Terms
Genres of Literature
Interpretation of Literature

UNIT II: POETRY
William Shakespeare: "Shall I compare thee to a summer's Day?
John Donne: "The Canonization"
Nissim Ezekiel: "Night of the Scorpion"

UNIT III: SHORT STORY
O Henry: "The Gift of the Magi"
Guy de Maupassant: "The Diamond Necklace"

UNIT V: PROSE
Robert Lynd: "Forgetting"

UNIT IV: ONE ACT PLAYS
Fritz Karinthy: "The Refund"
Stanley Houghton: "The Dear Departed"

REFERENCES:
1. Bennet, Andrew and Nicholas Royle: An Introduction to Literature, Criticism and Theory, 2004.
2. Daiches David: Critical History of English literature
3. Evans, Sir Ifor,:Short History of English literature
4. Kusch, Celena: Literary Analysis: The Basics

COURSE CODE P8ENNM41	SEMESTER-IV	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3
	COURSE TITLE- COMPUTER LITERACY IN TEACHING	

Unit I

About Windows – My Computer – My documents – Recycle Bin – Wall Paper – Screen Saver - Time and Data – Windows Accessories – Resizing and Moving a Window

Unit II

Formatting in MS Word – Formatting the text – Text Effects – Aligning the text – Applying Border and Shading – Adding Bullets and Numbering

Unit III

Microsoft Office PowerPoint

Introduction – Title Bar – Ribbon – Quick Access Tool Bar – Slides/Outline Pane – Creating a new presentation –Inserting Slides – Saving – Slide show – Closing the Presentation – Opening a saved file

Unit IV

Microsoft Office Publisher

Newsletters, Web Page, Poster, Chart and Certificate

Unit V

Apps [Applications] – Vocaroo – Skype – Blogging – Podcast

Reference Book

Peter Norton- Introduction to Computers 2009 7th Ed, TMH Publication

Objectives
i) *To understand the rule of Babur, Humayun and Akbar*
ii) *To familiarize about the rule of Jahangir, Shahjahan and Aurangzeb*
iii) *To discuss about the socio-cultural and economic life during the Mughals.*
iv) *To acquaint about the rise of Sikh and Maratha Powers*
v) *To learn the impact of Vijayanagar and Bahmani rule*

Unit - I: Babur to Akbar: Sources – Babur – Humayun – Sher Shah Sur – His Revenue Administration and Military Reforms – Downfall of the Sur Dynasty – Akbar – His military Campaigns – His Rajput policy – His Religious Policy – Achievements of Akbar

Unit - II: Jahangir to Aurangzeb: Jahangir – Nur Jahan – Visit of foreigners – Shahjahan – Golden Age of the Mughals – Foreign travellers – Aurangzeb – His North-west Frontier Policy – His Deccan Policy – His Rajput policy – Decline of the Mughals

Unit - III: Socio Cultural Life: Socio – economic life of the people during the Mughals – Mughal Administration – Progress in Art, Architecture, Painting, Music and Literature

Unit – IV: Sikhs and Marathas: Guru Nanak and his Successors – Rise and growth of Sikh Power –Relationship between Sikhs and Mughals - Rise of Marathas – Shivaji and his Successors – Maratha Administration

Unit -V: Vijayanagar and Bahmani Kingdoms: Vijayanagar – Successors of Krishna Deva Raya – Battle of Talaikota 1565 – Administration – Social and Religious Conditions – Art and Architecture – Bahmani's – Five Dhakni Sultanates – Socio-economic life – Cultural contributions – Art and Architecture.

Books for Study:
1) Khurana, K.L., *History of India from 1526 to 1967 A.D.,* Lakshmi Narain Agarwal Educational Publishers, Agra, 1995.
2) Krishna Reddy, *Indian History*, Tata Mc Graw-Hill publishing company limited, New Delhi, 2003.
3) Mahajan, V.D.*Advanced History of India*, S. Chand & Company, New Delhi, 1980.
4) Majumdar, R.C. et al., *An Advanced History of India*, Macmillan, New Delhi, 2002.
5) Nanda, S.P., *Landmarks in Indian History*, Dominant Publishers and Distributors, New Delhi, 2004.

Books for Reference:
1) Abraham, Eraly, *Emperors of the Peacock Throne*, The Saga of Great Mughals, Penguin Books, New Delhi, 1997.
2) Irfan Habib (Ed) *Mediveal India I*, Oxford University Press, New Delhi, 1992.
3) Satish Chandra, *History of Mediveal India*, Orient Blackswan, New Delhi, 2009.
4) Tripathi, R.P. *Rise and fall of the Mughal Empire*, Central Book Depot, Allahabad, 1956.
5) Vincent A. Smith, *The Oxford History of India*, Oxford University Press, New Delhi, 2002.

Objectives:
i) *To identify the land revenue policy methods of the British*
ii) *To know the Socio-religious Reforms of the 19th Century*
iii) *To understand the rise of the Dravidian Movement and its impact.*
iv) *To know the role of Tamil Nadu in Freedom Struggle*
v) *To assess the progress of Tamil Nadu after Independence*

Unit – I: Land Revenue Administration and Peasants: Permanent Revenue Settlement – Role of Zamindars-Village Settlement – Ryotwari Settlement – Tax Collection methods- Life of peasants- Famines of the 19th century-Irrigation projects

Unit – II: Socio-Religious Reform Movement – Abolition of Sati-Widow Remarriage-Child Marriage and Sarada Act-Abolition of Devadasi System-Abolition of Slavery

Unit – III: Dravidian Movement: Role of Christian Missionaries– Tamil Intellectual Renaissance- Justice Party Government and Social Reforms– Self-Respect Movement of E.V.R – Dravida Kazhagam – Rise of D.M.K.

Unit – IV: Freedom Struggle – Early Nationalist organisations- Madras Native Association-Madras Mahajana Sabha- Congress -Moderate leaders- Extremist leaders-Swadeshi Movement- Home Rule Movement – Gandhian Phase- Rowlatt Act Satyagraha- Non-Co-operation Movement – Vedaranyam Salt Satyagraha – Rajaji Government- Quit India Movement- Tamil Nadu on the eve of Independence

Unit -V: After Independence – Congress Governments – Linguistic organisation of States-Dravidian party governments – Anti Hindi Agitations - Social Welfare Schemes – Empowerment of Women – Development of Science, Economy, Education, Medicine, Agriculture and Technology.

Books for Study:
1. Arockiasamy, *History of Tamil Nadu*, Kudal Publications, Chennai, 1990.
2. Chellam V.T., *History of Tamil Nadu*, Kudal Publications, Chennai, 1990.
3. Pillai K.K., *Tamilaga Varalarum Panpadum (Tamil),* International Institute of Tamil Studies, Chennai.
4. Rajayyan. K., *History of Tamil Nadu (1565-1965),* Madurai Publishing House, Madurai, 1977.
5. Subramanian. N, *History of Tamil Nadu, Vol. II*. Koodal Publishers, Madurai.

Books for References
1. Arooran, N. *Tamil Renaissance and Dravidian Nationalism*, 1916-1944, Madurai, Koodal Publishers, 1980.
2. Baker, C. J., *The Politics of South India*, Vikas Publishing House, New Delhi, 1976.
3. Chokkalingam. *T. S. Kamaraj*, Navayuga Prasuram, Madras, 1955.
4. Chopra P.N., Ravindran T.K., and Subramanian N, *History of South India, Vol. III* S. Chand &Co, New Delhi, 1979.
5. Eugene. F. Irshick, Politics and Social Conflict in South India, (The Non-Brahmin Movement and Tamil separatism) 1916-1929, Oxford University Press, 1969.

COURSE CODE U8HIAL31	**SEMESTER-III**	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE- ALLIED-TOURISM IN SOUTH INDIA	

Objective:
1. *To discuss about the Fairs, Festivals and Shopping Potential in South India*
2. *To identify the cultural strengths of South Indian Tourism*
3. *To recognize the Historical tourist resources in South India*
4. *To know the religious centres attracting tourists*
5. *To deliberate on the emerging trends in South Indian Tourism*

Unit – I:Historical Tourism: Golconda Fort –Warrangal Fort – Nagarjunakonda–Amaravati –Chandragiri – Rayadurgam Fort –Mysore Palace - Hampi –Bidar – Aihole –Thanjavur Royal Palace – Tranquebar - Mahabalipuram –Gangai Konda Cholapuram–Gingee Fort – Thirumalai Nayakkar Mahal - Padmanabhapuram Palace - Bolghatty Place – Dutch Palace – Palakkad Fort or Tipu's Fort – Edakkal Caves –Viper Island & Cellular Jail.

Unit – II: Cultural Tourism: Classical Music: Carnatic– Trinity of Carnatic Music: Tyagaraja Swamigal – Muthusamy Dikshitar – Shyama Sastri – Carnatic Musical Instruments–Classical Dances: Kathakali – Kuchipudi -Mohiniattam–Martial Arts: Kalaripayattu–Silambam – Varmakalai – Talimkhana - Folklore: Folk Musics – Folk Dances – Fairs and Festivals: National Festivals – Famous Regional Festivals - Cuisines

Unit – III: Fairs, Festivals & Shopping: Cuisines: Hyderabadi – Chettinad – Udupi - Famous Art and Crafts: Clothing: Silk & Embroidery - Wood Craft - Stone Carving – Ivory Carving – Metal ware: Gold, Silver, Copper & Bronze – Bidri ware – Leather Crafts – Fairs and Festivals: National Festivals – Famous Regional Festivals: Ugadi - Dussehra – Pooram – Onam – Boat Race or Vallamkali – Pongal – Natyanjali Dance Festival – Car Festival – Karthigai Deepam Festival - Kavadi Festival – Tea & Tourism Festival.

Unit – IV: Religious and Spiritual Tourism: Badami Cave Temples – Shravanabelagola – Sringeri – Lepakshi – Puttaparthi – Hanamakonda –Badrachalam–Nagarjunasagar–Thirupathi – Srisailam –Srikalahasti– St. Philomena's Church, Mysore – St. Mary's Church, Belgaum – Khwaja Bande Nawaz Dargah –Rameshwaram – Nagapattinam -Madurai – Thanjavur- Guruvayur – Sabarimala – Sivagiri.
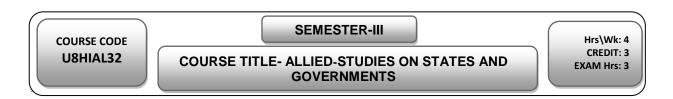
UNIT – V: Eco-Tourism: Backwaters, Alleppey– Rajamala National Park, Munnar – Gavi – Konni - Thenmala – Thodupuzha - Eravikulam National Park – Periyar National Park – Kodaikanal – Coorg – Nagarhole National Park – Bandipur National Park –Tyda–Maredumilli –**Dark Tourism:**Dhanushkodi – Viber &Cellular Jail, Andaman –**Medical Tourism:** Chennai, Health Capital of India – Bangalore (Stomach related Surgery) – Coimbatore (Heart Surgery & ENT Treatments) – Vellore (Cardiology) – Alleppey(Ayurveda) – Hyderabad(Plastic & Reconstructive Surgery)

Books for Study:
1. Dominique Sila Khan, *Sacred Kerala, A Spiritual Pilgrimage*, Penguin Books India Pvt., Ltd., Chennai.

2. Nirmala Choudhry y., *Historical and Eco-Tourism: Select Sites in Andhra Pradesh,* IthihasaPrabhasa Publishers, Hyderabad, 2007.
3. Reddy Ramu, *Tourism Industry in Andhra Pradesh*, Lap Lambert Academic Publishing, Hyderabad.
4. Revathy Girish, *Indian Tourist Panorama*, Wisdom Press, New Delhi, 2010
5. Sinha P.C, *Tourism Evolution, Scope, Nature and Organisation*, Anmol Publications Pvt. Ltd., New Delhi.

Books for Reference:
1. Bhatia, A.K. *Tourism Development – Principles and Practices,* Sterling Publishers Pvt. Ltd., New Delhi 1992.
2. Burkart A.J. and Madlik, *Tourism, Past, Present and Future*, Heinemann, London, 1994
3. *Karnataka Tourist Map*, Stark World Team, Stark World, Bengaluru, 2008
4. Michael Wood, *A South Indian Journey: The Smile of Murugan*, Penguin Books, New Delhi, 1996.
5. Prem Nath Seth, *Successful Tourism Management*, Sterling Publishers Pvt. Ltd., New Delhi 1997.

COURSE CODE U8HIAL32	SEMESTER-III	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3
	COURSE TITLE- ALLIED-STUDIES ON STATES AND GOVERNMENTS	

Objectives

(i) To identify the elements and types of States
(ii) To discuss the classification of Constitutions
(iii)To know about the different types of Executive
(iv)To highlight on the importance of Legislatures
(v) To understand the functioning of Judiciary

Unit - I:State: Origin of the State- Elements of State – Sovereignty- Unitary State- Merits and Demerits-Federal State- Merits and Demerits-Welfare State- Confederation

Unit – II: Constitution: Definition of the Constitution –Aristotle's classifications of Constitution- Modern Classification of Constitutions- Written and Unwritten – Merits and Demerits-Rigid and Flexible Constitutions- Merits and Demerits

Unit - III: Executive: Powers and Functions of Executive – Parliamentary Executive-Presidential Executive- Plural Executive- Separation of Powers- Civil Service

Unit -IV: Legislature: Powers, functions and duties of Legislature– Unicameral and Bicameral legislature- Procedure of legislations- Committee system- Suffrage- Constituency-Proportional representation-Direct Democracy- Party system- Pressure Groups

Unit -V: Judiciary: Law- Powers, Functions and duties of Judiciary-Independence of Judiciary- Rule of law – Administrative law

Books for Study:

1. Amal Roy and Mohit Bhattacharya, *Political Theory: Ideas and Institutions,* The World Press, Calcutta, 2002.
2. A. Appadurai: *Substance of Politics*: Oxford University Press, New Delhi, 1990.
3. C.F.Strong, *Modern Political Constitutions*, Sidgwick & Jackson Limited, London, 1973.
4. Kapoor A.C., *Select Constitution*, S. Chand& Co, New Delhi.

Books for Reference:

1. Mahajan, V.D., *Select Modern Governments*
2. Johari J.C., *Modern Constitution*, S.Chand & Co. New Delhi, 1990
3. Johari. J. C.*Principles of Modern Political Science*, Sterling, New Delhi, 1999.
4. Kapoor A.C., *Principles of Political Science*, S.Chand & Co., New Delhi, 2000.
5. Wheare, K.C. *Modern Constitutions*

Objectives:
(i) To discuss about the Later Mughals and their downfall
(ii) To understand the reasons for English supremacy
(iii)To study about the Early English Administrators
(iv)To study the Later English Administrators
(v) To discuss on the Cause, Course and Impact of the Great Uprising

Unit-I: Later Mughals: Successors of Aurangzeb- Rise and Fall Sayyed Brothers- Invasion of Nadir Shah- Peshwas-Ahmad Shah Abdali's Invasion-Third battle of Panipat- Down fall of Mughals

Unit-II: Advent of Europeans: Portuguese-Dutch- Danes - English East India Company – French East India Company – Three Carnatic Wars-Battle of Plassey -Battle of Buxar- First Mysore War- Clive and English Supremacy-

Unit-III: English Administration I: Warren Hastings- Second Mysore War- Achievements of Warren Hastings-Lord Cornwallis- Third Mysore War- Permanent Settlement – Sir John Shore and non- intervention-Lord Wellesley- Subsidiary System-Fourth Mysore War-The Second and Third Maratha War

Unit-IV: English Administration-II: Lord Hastings-Nepal War- Pindari War-Fourth Maratha War-Maharana Ranjit Singh- Lord Amherst- Burmese Wars-Lord William Bentick- Social Reforms-Lord Auckland- Afghan Wars-Lord Hardinge –Sikh Wars-Lord Dalhousie- Burmese war-Reforms - Doctrine of Lapse

Unit-V: Great Uprising and After: Nature-Causes of the Great Uprising- Course of Events- Causes for the failure- Results of the Uprising-Effects of Industrial Revolution in India

Books for Study:
1. Bipan Chandra, *Modern India*, NCERT, New Delhi, 1972.
2. Grover. B.L., *A New Look of Modern Indian History*, S. Chand & Co, New Delhi,1977.
3. Natarajan S. and Prema Ramakrishnan, *Political and Cultural History of India, Vol. II.* Secunderabad, 1991.
4. Percival Spear, *A History of India*, Vol. II. Penguin Books, New Delhi, 1976.
5. Roberts P.E., *History of British India*, Oxford, 1921.

Books for Reference:
1. Desai, A.R., *Social back ground of Indian Nationalism*, Popular Prakasam, Bombay,1960.
2. Lucy Sutherland, *The East India Company in 18th Century Politics*, Oxford, 1952.
3. Philips C.H., *East India Company*, London, 1962.
4. Ramachandran C., *East India Company and the South Indian Economy*, New Era Publications, Madras, 1980.
5. Sir Syed Ahmad Khan, *The Indian Revolt*, Benares, 1873.

Objectives:
(i) To introduce the students to the basics of Indian Foreign Policy
(ii) To understand the important transactions in Indo–Chinese and Indo-Nepal Relations
(iii) To discuss about the Indo – Pak and Indo-Bangladesh Relations
(iv) To focus on India's relations with Sri Lanka, Maldives and Bhutan
(v) To study about organizations of Regional Cooperation.

Unit – I:Introduction: Definition of foreign policy – Determinants of foreign policy – India's foreign policy: Panch Sheel -Non –Aligned Movement —– Anti – Racism, Anti - Colonialism – Peace efforts

Unit – II: **China and Nepal**: India and China: Panch Sheel Agreement – Tibet, Dalai Lama and border dispute -1962 war and frozen relations – 1967 Nathu la and Cho La clashes- Arunachal Pradesh issue -Rajiv Gandhi's visit to China – improvement in bilateral relations – Areas of concern. – Indo – Nepal Relations – Trade and transit treaty – India's security concerns.

Unit – III: - **Pakistan & Bangladesh**: Kashmir conflict – Junagadh issue–Indus treaty – War of 1965- War of 1971 - Shimla Agreement – Agra Summit- Kargil War- India and Bangladesh: Early relations during Sheikh Mujibur Rahman – Farakka water Dispute and Settlement – Chakma refugees – Border Dispute Redressal

Unit – IV: **Sri Lanka, Maldives and Bhutan**: Indian and Sri Lanka: Shastri – Srimavo pact 1964 – Katchativu settlement –   Eelam Question and Indian Response – IPKF and its impact – India and Maldives – Indo – Bhutanese relations.

Unit – V: Regional Co-operation: Common wealth - ASEAN- SAARC – Indian Ocean as a zone of   Peace – G8 – G20.
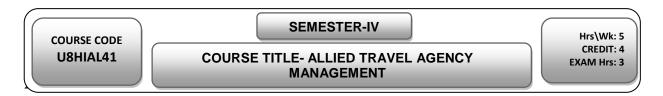
Books for Study:
1. Appadorai A. *The Domestic Roots of India's Foreign Policy*, Oxford University Press, Delh, 1981.
2. Bipan Chandra et.al. *India after Independence 1947-2000.* Penguin Books, New Delhi, 2000.
3. Dixit J.N. *India's Foreign Policy and Its Neighbours,* Gyan Publishing House, New Delhi, 2001
4. Dutt, V. P., *India's Foreign Policy in Changing World,* Vikas Publishing House, New Delhi, 2003.
5. Palanithurai G. and Mohanasundaram K. *Dynamics of Tamil Nadu Politics in Sri Lankan Ethnicity,* Northern Book Centre, New Delhi, 1993).

Books for Reference:
1. Chaitanya, Mishra, *Indo-Nepal Relations: A View from Kathmandu*, Sage Publications, New Delhi, 1993.

2. Dixit, J.N. *Assignment Colombo*, Konark Publishers, New Delhi, 1998.

3. Deb Arinda, Bhutan and India, *A Study in Frontier Political Relations*.

4. Muhammed Shamsul Haq, *Bangladesh in International Politics*, Sterling Publishers, 1993

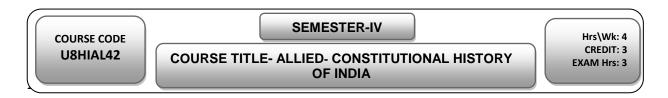5. Satish Kumar (Ed): *Documents of India's Foreign Policy, (1974)* The Macmillan Co., Delhi, 1977.

COURSE CODE U8HIAL41	SEMESTER-IV	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE- ALLIED TRAVEL AGENCY MANAGEMENT	

Objectives:
(i) To create awareness on evolution of Travel Agency
(ii) To understand the different Travel Agent Associations
(iii) To know about the different Functions of a Travel Agency
(iv) To discuss on the operational procedures of a Travel Agency
(v) To identify the various job roles in a Travel Agency

Unit – I: Origin, Growth and Development of Travel Agency: Thomas Cook and the Organisation of Travel – The Grand Circular Tour – Hotel Coupons – The American Express Company –Introduction of Air Travel – Polytechnic Touring Association – Lunn Poly – Thomson Travel Group – Cox & Kings Ltd.

Unit – II: Federations of Travel Agents: The American Society of Travel Agents, Inc. (ASTA) –Universal Federation of Travel Agents Association (UFTAA) – World Travel Agents Association Alliance (WTAAA) – International Air Transport Association (IATA) – Travel Agents Federation of India (TAFI) - Travel Agents Association of India (TAAI).

Unit – III: Functions of a Travel Agency: Guidelines for Recognition as an Approved Travel Agency - Opening a Travel Agency –Services provided by a Travel Agency: Transportation Services – Accommodation Services – Related Services – Planning of Sightseeing – Shopping – Rights and Duties - Guidelines for Recognition as an Approved Travel Agency.

Unit – IV: Operational Procedures of a Travel Agency: Retail Travel Agent – Tour Operators – Education and Training – International Passage Booking – Documentation Section – Reservation Section – Visa Section – Sales Section – Domestic Passage Booking – Procedures for Acquiring Tickets – Tour Operation – Procedure for Appointments of Agents – Service Order.

Unit – V: Job Structure in Travel Agency: Travel Agency Manager – Assistant Travel Agency Manager – Head of the Travel Organisation Section – Head of Specialized Services Section –Sales Promotion or Public Relation Officer – Congress Officer – Publicity Officer – Transfer Officer – Head Clerks – Package Tour Officers – Assistant to the Package Tour Officer – Assistant to the Transfer Officer – Counter Clerk – Messenger – Job Structure in Destination Service Sector.

Books for Study:
1. Bhatia A.K., *The Business of Travel Agency & Tour Operations Management,* Sterling Publishers Pvt. Ltd., New Delhi.
2. Devanesan A., *Travel Management,* Renu Publications, Kanyakumari District
3. Jagmohan Negi, *Air Travel Ticketing and Fare Construction*, Kanishka Publishers, New Delhi, 2008
4. Pram Nath Seth, *Successful Tourism Management*, Sterling Publishers Pvt. Ltd., New Delhi, 1967.
5. Pram Nath Seth and Sushma Seth Bhat, *An Introduction to Travel and Tourism*, Sterling Publishers Pvt. Ltd., New Delhi, 1967.

Books for Reference:
1. Bhatia, A.K., *International Tourism Management*, Sterling Publisher, New Delhi, 2004.
2. Biswanath Ghosh: *Tourism and Travel Management*, Vikas Publishing House Pvt Ltd, New Delhi, 2001
3. James W, Morrison, *Travel Agents & Tourism – A Manual of Travel Agency Operation* ARCO Publishing Co, NYC.
4. Lickorish, L.J & Kershaw, A.G, *The Travel Trade*, Practical Press Ltd., London, 1958
5. Peter Robinson, Paul Fallan, Harry Cameron & John Crafts: *Operations Management in the Travel Industry,* CAB International, Oxford shire, UK.

COURSE CODE U8HIAL42	SEMESTER-IV COURSE TITLE- ALLIED- CONSTITUTIONAL HISTORY OF INDIA	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

Objectives:
1. To study the circumstances for passing of the Acts
2. To study the Constitutional Development in India
3. To study the   gradual decentralization of powers in India
4. To study the basic features of the Government of India Acts

Unit – I: Constitutional Developments up to 1853 A.D.: Regulating Act- Pitt's India Act-Features, Merits and Demerits of Charter Acts of 1793, 1813, 1833 and 1853

Unit- II: Indian Councils Acts: Great Mutiny- Government of India Act 1858- Queen's Proclamation-Indian Councils Act of 1861 and 1892

Unit-III: Minto Morley Reforms: Minto-Morley Reforms- Separate Electorates-Causes for failure of Minto-Morley Reforms -Home Rule Movement-Lucknow Pact

Unit- IV: Montague Chelmsford Reforms: Government of India Act 1919- Salient Features-Nature and working of Dyarchy - Internal and External Causes for failure of Dyarchy- Rowlatt Act and Jallianwala Bagh Massacre- Simon Commission- Nehru Report

Unit-V: Government of India Act 1935 and Indian Constitution: Government of India Act 1935: Salient Features-Criticism of the Government of India Act 1935-Provincial Governments-Working of Provincial Autonomy- Cripps Mission- Cabinet Mission- Constituent Assembly- Indian Constitution- Salient Features of Indian Constitution

Books for Study:

1. Agarwal, R.C, *Constitutional Development and National Movement of India*, S. Chand & Company Ltd., Ram Nagar, New Delhi, 1997.
2. Banerjee, A, *Constitutional History of India*, Macmillan Company, India Ltd., Meerut, 1978.
3. Durga Das Basu, *Introduction to the Constitution of India*, Wadhwa &Company, Law publishers, Agra, 2004.
4. Pylee, M.V. *Constitutional History of India*, S. Chand Publishing, New Delhi, 2010
5. Mahesh Bhatnagar & Agarwal R.C., *Constitutional Development and National Movement*, S. Chand Publishing, New Delhi, 1994

Books for Reference:

1. Amal Roy and Mohit Bhattacharya, *Political Theory: Ideas and Institutions*, The World Press, Calcutta, 2002.
2. Appadurai A, *Substance of Politics*: Oxford University Press, New Delhi, 1990.
3. Bipan Chandra, *Modern India*, NCERT, New Delhi, 1972.
4. Grover. B.L., *A New Look of Modern Indian History*, S. Chand & Co, New Delhi,1974
5. Percival Spear, *A History of India, Vol. II.* Penguin Books, New Delhi, 1976

COURSE CODE P8HI3001	**SEMESTER-III** **COURSE TITLE- Social and Cultural History of India from 1857 A.D. to 2010 A.D.**	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objectives:
(i) To evaluate the growth of Educational System
(ii) To study the Socio Religious Reform Movements
(iii) To understand the Peasant Movements
(iv) To know the different Labour Movements
(v) To analyze the Cultural Developments

Unit-I: Education in British and Independent India: Traditional Hindu and Muslim Educational Systems – Patshalas and Madrasas – Introduction of Western Education – Wood's Despatch – Universities of 1857 – Hunter Commission – Aligarh Muslim University-Jamia Milia Islamia-Dr. Radha Krishnan Commission – University Grants Commission: Its Contribution to Higher Education – Kothari Commission – New Education Policy of 1986 – Centres of Higher Education : Indian Institute of Technology, Indian Institute of Managements, National Institutes of Technology and other institutions – Engineering and Information Technology Education

Unit-II: Religious and Social Reform Movements in British India: Brahmo Samaj, Prathana Samaj, Satya Shodhak Samaj, Arya Samaj, Ramakrishnan Mission. Theosophical Society – Swami Narayana (Gujarat), Satnamis and Narayana Guru (Kerala) – Muslim Reform Movements: Deoband, Aligarh, Ahmadiyya, Barelwi and Ahl-i-Hadith Movement – Sikh Reform Movements: Nirankari and Namdhari Movements – Parsi Reform Movement: Rehnuma-i-Mazdayaznan – Neo Buddhism "Navayana" of Ambedkar.

Unit-III: Peasant Movements: European Planters and Indian Peasants – Agrarian Crisis during the British period – Kisan Sabha and Ekta Movements in U.P. –Mapilla Rebellion in Malabar – Bardoli Satyagraha in Gujarat – Great Depression and Agricultural Crisis In India – All India Kisan Congress – N.G.Ranga and Swami Shajanand – Karshaka Sangam's of Malabar – Kisan Sabha's of Punjab and Bengal – Peasant Movement in Post Independent Tamil Nadu: Peasant and Cauvery, Krishna Water Issue.
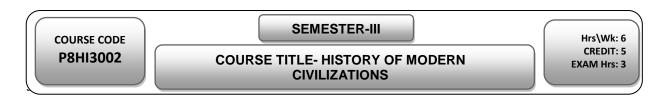
Unit-IV: Trade Union Movements: Growth of Trade Union Movements from 1920 to 1947 – Trade Union Movements in Post-Independence India (1947-2001): Major Trade Unions AITUC – BMS – INTUC – CITU – HMS – Trade Unions of Tamil Nadu: Progressive Labour Front and Anna Thozhilalar Sangam.

Unit-V:Art and Architecture: Colonial Art and Architecture – Post Independent India: Cultural Development – Lalit Kala Academy- Sahitya Academy, Sangeet Natak Academy and Sangeet Kala Academy – Accomplished Classical Musicians and Classic Dancers – Painters and Sculptors of Modern India

Books for Study:
1. Chandra, Bipin: *India's Struggle for Independence*, Penguin Books, New Delhi, 2000.
2. Chandra, Bipin: *India Since Independence*, New Delhi, 2002.

3. Chandra, Bipin: *Nationalism and Colonialism in Modern India*, Orient Longman, New Delhi, 1999
4. Majumdar, R.C. Ray Chaudhari, H.C. and Kalikinkar Datta: *An Advanced History of India*, Macmillan Press, Madras, 1998.
5. Sarkar, Sumit, *Modern India 1885-1947*, Macmillan Press, New Delhi, 2002

Books for Reference:
1. Desai, A.R., *Social back ground of Indian Nationalism*, Popular Prakasam, Bombay,1960.
2. Grover, B.L. and Grover S., *A New Look at Modern Indian History*, S. Chand & Co, New Delhi,1998 .
3. Jones, Kenneth W, *Socio – Religious Reform Movements in British India,The New Cambridge History of India Series,* Foundation Books, Cambridge University Press, New Delhi, 1994.
4. Rajni Kothari, *Politics in India*, Orient Longman, Hyderabad, 1970
5. John Desrochars and George Joseph, India Today, Centre for Social Action, Bangalore, 1988.

COURSE CODE P8HI3002	SEMESTER-III COURSE TITLE- HISTORY OF MODERN CIVILIZATIONS	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objectives:
1. *To know the developments that took place during Renaissance.*
2. *To study the impact of French Revolution and Industrial Revolution.*
3. *To understand the emergence of Internationalism*
4. *To study the historic World Wars and its impact.*
5. *To update the knowledge of modern scientific developments.*

Unit -I: Renaissance: Introduction – Definition – Renaissance in Italy – Revival of Classical Literature – Renaissance Literature – Art - Sculpture – Science – Results - **Geographical Discoveries:** Causes – Portugal – Spain - Other Geographical Discoveries by the Europeans – Impact of the Geographical Discoveries - **Reformation:** Causes – Martin Luther – Ulrich Zwingli – John Calvin – King Henry VIII - **Counter Reformation:** Ignatius Loyola – Effects of Reformation

Unit -II: French Revolution: Causes for the Revolution – The French Philosophers – Convening of States General – National Assembly - Fall of Bastille – Political Clubs – The Legislative Assembly – The National Convention – Results - **Industrial Revolution:** Causes – Scientific Inventions – Development of Transport – Communication – Iron and Steel – Merits and demerits of Industrial Revolution - Agrarian Revolution

Unit – III: Rise of Colonialism and Imperialism: Colonialism – Imperialism - **First World War:** Causes, course and results of First World War - **Russian Revolution:** Causes, course and results of Russian Revolution - **League of Nations:** Establishment, aims and organs of the League -Its achievements and failure

Unit – IV: Second World War: Causes course and results - **United Nations Organization:** Foundation and Organization of UNO – Achievements of UNO – United Nations Educational Scientific and Cultural Organization (UNESCO)

Unit – V: Cold War: Causes and results - **Gulf War:** Causes and results – **Scientific Developments:** Scientific developments of the 19th and 20th Centuries

Books for study:
1. Kettleby C.D.M, *A History of Modern Times From 1789*, Oxford University Press, Bombay, 1965.
2. Swain, J. W., *Beginning of the Twentieth Century*, W. W. Norton & Company, New York, 1955.
3. Wadell L.A., *The makers of Civilization in Race & History*, S. Chand & Co., New Delhi, 1968.
4. William. L. Langer, et.al. *Western Civilization II, The Expansion of Empire to Europe in the Modern World,* Harper & Row publishers, New York.
5. William Cecil Dampier, *A History of Science and its relations with Philosophy of Religion,* Cambridge University Press, 1929.

Books for Reference:
1. Davis, H.A. Revised by D.H.C. Blount, *An Outline History of the World,* New Delhi: Oxford University Press, 1968.
2. Hobsbawm, E.J. *The Age of Revolution*, 1789-1848, Phoenix press, London, 1977.
3. Hobsbawm, E.J. *The Age of Capital*, 1848-1875. Phoenix press, London, 2010
4. Hobsbawm, E.J, *The Age of Empire*, 1875-1914, Phoenix press, London, 2011
5. Mckinley,Albert E.,Arthur C. Howland & Matthew L. Dawn,*World History,* Vol I & II. New Delhi: Atlantic Publishers,1994

Objectives:
1. To understand the meaning, nature and scope of History
2.To realise the relationship between History and Allied Social Sciences
3. To identify the different traditions of writing History
4. To know about the ancient Historical tradition of India
5. To analyse the colonial and nationalist approaches in the Historical writings.

Unit- I: Introduction: History Meaning and its Definitions –Nature and Scope, Purpose and Value of History –Philosophy of History-History as a Science and Art –Morality –Causation - Generalization.

Unit- II: History and Allied Sciences: History and its Relations with other Social Sciences – Geography –Archaeology - Anthropology -Economics - Political Science -Sociology – Psychology - Literature.

Unit- III:World Historiography: Greco – Roman Historiography -Herodotus &Thucydides - Livy & Tacitus – Christian Historiography - St, Augustine –Arab Historiography –Ibn Khaldun - Modern Historiography –Edward Gibbon – Ranke – Toynbee – Karl Marx.

Unit – IV: Indian Historiography: Purana Itihasa Tradition in Ancient India – Kalhana – Bilhana – Bana – Medieval Historiography –Alberuni, ZiauddinBarani, Abul Fazal – Abdul Hamid Lahori–IrfanHabib

Unit – V: Colonial Historiography –James Mill –KM Panikkar – NationalistHistoriography –Communal, Marxist and Subaltern Historiography.

Books for Study:

1. Aggarwal J.C., *Teaching of History- A Practical Approach*, Vikas Publishing House Pvt. Ltd., New Delhi, 1992.
2. Kochhar, S.K., *Teaching of History*, Sterling Publishers Pvt. Ltd., Madurai, 1987.
3. Rajayyan.K, *History in Theory and Method*, Ratna Publications, New Delhi.
4. Sheik Ali, History - *Theory and Method*, Macmillan, New Delhi, 1981.
5. Subramanian N., *Historiography*, Koodal Publishers, Madurai, 1978.

Books for Reference:

1. Carr E.H., *What is History*, Pelican Books, 1964.
2. Chaffer, John & Lawrence Taylor, *History and the History Teachers*, George Allen & Unwin Ltd. London, 1975
3. Elton, *Practice of History*, Thomas. Y. Cromwell, New York, 1967.
4. Ranajit Guha, *Subaltern Studies*, (Six Volumes) Oxford University press, New Delhi,1994.
5. Romila Thapar, *Past and Prejudice*, Ministry of Information and Broadcasting, Government of India, 1973.

Objectives:
1. *To discuss the origin of Ottoman empire*
2. *To highlight on the Ottoman empire under Mehmed II and his Successors*
3. *To understand the importance of Suleiman the Magnificient and his descendants*
4. *To study the administration of Ottomans*
5. *To analyse the progress of Art and Culture under the Ottomans*

Unit – I: Origin and Growth: The Origin and Rise of the Ottoman Empire – Osman I – Orkhan – Murad I – Jan Nissaries – Bayezid I – Mehmed I – Murad II

Unit – II: Consolidation: Mehmed II, the Conqueror – The conquest of Constantinople – Administration – Imperial Central Government – Bayezid II – Selim I –Foreign Relations with Shah Ismail & Babur

Unit – III: Progress: Suleiman the Magnificent – Conquests in Europe – Ottoman-Safavid War – Invasions in the Indian Ocean – Invasions in Mediterranean and North Africa – Administrative Reforms –Art and Architecture under Suleiman - Selim II and Grand Vizier, Sokolli

Unit – IV: Administration: Contribution of Murad III to Arts –Administrative system of Ottoman Turks: Central Administration – House of Osman –Imperial Harem – Palace Schools – The Divan – Provincial Administration – Vassal tributary States - Military Organization of the Ottomans
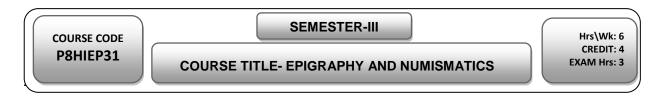
Unit – V: Art and Culture: Development of Art, Architecture and Literature: Haji Ozbek Mosque – Grand Mosque of Bursa – Topkapi Palace - Blue Mosque – Mimar Sinan – The Crown of Histories – Decline of the Ottoman Empire

Books for Study:
1. Roger Bigelow Merriman, *Suleiman the Magnificent*, 1520-1566, Lunderg Press, Midway, USA, 2013
2. Sir Paul Rycaut, *History of the Turkish Empire*, (1628-1700), 2 Volumes, Oxford University Press, London, U.K, 2005.
3. Lord Kinross, *The Ottoman Centuries, The Rise and Fall of the Turkish Empire*, Harper Perennial, New York, 1979.
4. Bernard Lewis, *Istanbul and the Civilization of the Ottoman Empire*, University of Oklahoma Press, USA, 1963
5. Halil Inalcik, *The Ottoman Empire, The Classical Age 1300-1600*, Phoenix Press, New Heaven City, USA,2001

Books for Reference:
1. William Deans, *History of the Ottoman Empire: From the Earliest Period to The Present Time* – Primary Source Edition, Wentworth Press, Sydney, 1854
2. Orhan Pamuk, *Istanbul Memories and the City*, Faber Publications, London, 2006

3. Sir Edward Shepherd Creasy, *History of the Ottoman Turks*, Nabu Press, South Carolina, USA, 2012
4. Stanley Lanepool, *The Story of Turkey*, Kessinger Publishing Co, Montana, US, 2004.
5. Herbert Adams Gibbon, *The Foundation of the Ottoman Empire*, Wentworth Press, Sydney, 2016.

COURSE CODE P8HIEP31	SEMESTER-III COURSE TITLE- EPIGRAPHY AND NUMISMATICS	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives:
1. To study the nature and scope of Numismatics and Epigraphy.
2. To understand the Coinage of different dynasties.
3. To understand the Barter system and coins made of different metals in India
4. To know the various scripts in Indian
5. To Narrate the general features and Methods of dating, Inscriptions.

Unit-I: Introduction: Definition,Nature and Scope of Numismatics and Epigraphy: Numismatics and Epigraphy as source material- Political,Cultural, Economic and Religious History - Evolution of Coinage - Literary and Archaeological evidence.

Unit –II: Early Indian Coins: Barter System – Punch marked Coins – Local Series – General Characteristics –Metal Fabric, Metrology and Symbols – Indo – Greek Coins – Indo Scythian and Indo Parthian Coins General Characteristics – Devices and legends   - Coinage of Kushanas – General Features.
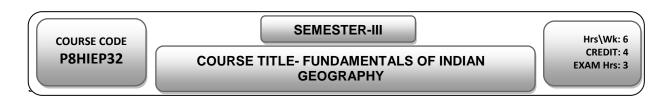
Unit –III: Early Coins of South and Western India: Satavahana, and Western Satraps, Vishnukundis – Coins of Kalachuris – Coinage of Guptas – Coins of South India – Satavahana, Chalukyas, Cholas, Pandyas, and Cheras.

Unit – IV: Origin and Antiquity of Writing in India: Writing Material in Ancient India – The Brahmi Script – Kharosthi Script – Tamil, Vatteluthu Tamil Scripts – Evolution of Telugu, Kannada and Malayalam Scripts.

Unit – V: Epigraphy: Methods of dating –Inscriptions –General features and characteristics – Attempts to Decipher – Ancient Indian Numerals - General contents and Format of Inscriptions- Types of Inscriptions – Select Inscriptions –Erragudi –Edict of Asoka – Hathigumpa Inscription of Kharavela-Allahabad Pillar Inscription of Samudragupta Nasik Inscription of Pulakesin –II.

Books for Study:
1. Allen john   - *Catalogue of Coins of Ancient India*, British Museum, London, 1936.
2. Altekar A.S - *Coinage of the Gupta Empire*, Numismatics Society of India,Varanasi,1957.
3. Bhandarkar D.R- *Lectures on Ancient Indian Numismatics*, Calcutta University, 1921.
4. Brown C.J. - *Coins of India*
5. Chakravarthi S.K – *Ancient Indian Numismatics*

Books for Reference:
1. Chattopadhyay S, *Coins and Icons- A study of Myths and Symbols in IndianNumismaticsArt,* Panthi Pustak, Calcutta ,1977.
2. Chattopadhyay and Brajadulal, *Coins and Currency Systems in South India.* New Delhi, 1977.
3. Desikachari, T., *South Indian Coins*, Trichinopoly, 1933.
4. Kosambi, D.D., *Indian Numismatics*, New Delhi, 1981.
5. Hultzsch, E., *South Indian Copper Coins*, IA., xxi, 1892.

COURSE CODE P8HIEP32	SEMESTER-III	Hrs\Wk: 6
	COURSE TITLE- FUNDAMENTALS OF INDIAN GEOGRAPHY	CREDIT: 4 EXAM Hrs: 3

Objectives:
(i) To Know about the Climate, Rainfall, Soils, and Natural resources of India
(ii) To discuss the importance of Indian Agriculture
(iii) To identify the Mineral resources of India
(iv) To study the Industrial Progress of India
(v) To understand the importance of Human Resource

Unit– I: Introduction: India: Location- Physiography and its significance – Climate – Rainfall variation and Distribution – Climatic Regions – Soil: Types and Distribution – Erosion and Conservation – Natural Vegetations- Forest distribution and its Products – Water Resource – River Irrigation: Types – Distribution – Multipurpose Projects – Damodar Valley Corporation.

Unit -II: Agriculture: Importance of Agriculture- Distribution and Production of the following crops: a) Paddy b) Wheat C) Cotton D) Jute e) Tea F) coffee – Problems of Indian Agriculture.

Unit – III: Mineral Resources: Distribution, Production and Trade of the following Minerals: Iron, Mangnese, Mica and bauxite – Power resources: Coal, Petroleum and natural Gas- Atomic minerals – Power Distribution and Production.
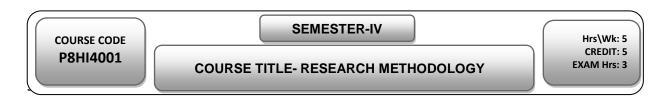
Unit – IV: Industries: Location factors- Major Industries: Iron and Steel, Shipbuilding, Chemicals, Paper, Cement and sugarcane Industries, Leather Industry.

Unit – V: Human Resources: Population - Growth and Distribution – Ruraland Urban Population – Migration: Types- Causes and Consequences.

Books for Study:
1. Ranjit Tirtha, *Geography of India,* Rawat Publications, Jaipur,1996.
2. Sharma, T.C. and O.Coutinho, *Economic and Commercial Geography of India*, Vikas Publishing House Ltd., New Delhi, 1978
3. Nagi, B.S., *Geography of India*, Kedarnath, Ramnath, Meerut, 1990.

4. Majid Hussain, *Geography of India*, Tata Mc Graw Hill, 2017.
5. Khullar D.R., *India- A Comprehensive Geography*, Kalyan Books.

Books for Reference:
1. Madras Institute of Development Studies (MIDS),*Tamil Nadu Economy, Performance and Issues*, Oxford and IBH Publishing Co., Ltd., New Delhi,1988.
2. Regional Divisions of India, *A Cartographic Analysis- Series I, Volume XX*, Tamil Nadu, 1988.
3. Ramesh. A. andTiwari P.S., *Basic Resource Atlas of Tamil Nadu*, Department of Geography, University of Madras, 1983.
4. Gopal Singh, *Geography of India.*
5. Ramamurti, *Geography of India Systematic.*

COURSE CODE P8HI4001	SEMESTER-IV COURSE TITLE- RESEARCH METHODOLOGY	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

Objectives
1. To introduce the meaning, nature and scope research among the students
2. To promote the idea of Hypothesis and Research outline
3. To educate the students how to collect the data
4. To train the students, how to write the Thesis
5. To Explain to the students the basics of Compilation

Unit –I: **Research Meaning:** Definitions –Nature and Scope of Research -Heuristics - Internal Criticism –External Criticism, Synthesis and Exposition – Conjecture –Subjective and Objective elements in History.

Unit –II: Topic of Research: Feasibility–Features of Researcher – Hypothesis-Research outline–Collection of Sources–Types of Sources: Primary, Secondary and Tertiary –Methods of Data collection: Questionnaire -Interview. Libraries –Archives – Field work -

Unit –III: Classification and Analysing the data: Methods of Authentication of Data Arrangement of Data – Different Stages for the Preparation of Thesis Report Declaration, Acknowledgements – Certificate.

Unit –IV:Thesis Writing: Introduction –Scope of the Topic – Objectives of Research Topic –Methodology –Review of Literature– Chapterisation –Logical arrangement of chapters – Citation – Acknowledgement of sources –

Unit- V: Explanation: Analytical Writing- Language- Need for consistency and terminological clarity - Footnotes -   Research Findings – Conclusion Bibliography –Tables, Maps, Charts –Glossary.
Books for study:
1. Anderson, J. and Derston, *Thesis and Assignment*, Wiley Eastern Ltd., Madras, 1991.

2. Bell Judith., *Doing your Research Projects, A Guide to 1st time Researches in Education and Social Science*, 3rd ed., Viva Books, Chennai, 1999.
3. Carr, E.H., *What is History*, London, Macmillan and Co., 1961.
4. Clifford E.Lunneborg., *Data analysis by resampling: Concepts and Applications*, Dusbury Thomson learning, Australia, 2000.
5. Finn John, A., *Getting a Ph. D.,* Routledge, New York, 2005.

Books for Reference:
1. Gibaldi Joseph, *M.L.A Handbook for Writers of Research Projects,* 4th ed., New Delhi, Affiliated East West Pvt. Ltd., 1996.
2. Gupta Santhosh, *Research Methodology and Statistical Techniques*, Deep and Deep Publication Pvt. Ltd., New Delhi, 2005.
3. Jeremy J. Foster, *Data analysis using SPSS for windows*, Sage publications, London, 2001
4. Koilpillai, J. Charles., *How to write a Research Essay, A primer on the Application of the Scientific Method,* Nalanda House, Madras, 1990.
5. Manickam, S., *Theory of History and Method of Research*, Madurai, 1997.

COURSE CODE P8HI4002	SEMESTER-IV COURSE TITLE- PRINCIPLES OF ARCHAEOLOGY	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

Objectives:
1. To introduce the concept of Archaeology.
2. To understand the methods of Excavation.
3. To know the methods of Preservation of Archaeological Remains.
4. To discuss on the evolution of Archaeology in India.
5. To Gain the knowledge of important excavated sites in India.

Unit – I: Introduction: Definition, nature and scope of Archaeology –Exploration and Survey –Relationship ofArchaeology with History, Anthropology and the other pure sciences.
Unit – II: Excavation: Purpose and Methods –underwater Archaeology with special Reference to Developments in India-Data collection methods Stratigraphy, Radio carbon Method, Methods of Relative Dating Typological Sequences, Absolute Dating, Thermo-Luminescence.

Unit – III: Conservation and Preservation of Archaeological Remains: Principles of Conservation Cultural property –Chemical Treatment of Organic and Inorganic Objects – Conservation of Monuments and other Objects- Museum Management -Museum techniques.

Unit – IV: Origin and development of Archaeology in India - Contributions of Eminent Archaeologists: Sir William Jones - Rev. Fr. Heras S.J., Alexander Cunningham - Lord Curzon - Sir John Marshall - Sir Mortimer Wheeler – Muller -Developments since Independence.
Unit – V: Important excavated Sites: Taxila, Hastinapura, Pataliputra, Arikamedu, Nagarjunakonda, Amaravathi, Kotilingala. Archaeology and Public: Threats to Archaeological sites: Damage by Development Projects Damage due to ignorance.

Legislative basis of Conservation and protection of Heritage –Archaeological and public Awareness.

Books for Study:
1. Dhaky, M.A. ed. *Encyclopaedia of Indian Temple Architecture of North India*, American Institute of Indian Studies, OUP, Delhi, 1991.
2. Dhani, S., *Palaeography and Development of Archaeology*, ASI
3. Gopinath Rao, *Indian Iconography*,
4. John Marshall, *Conservation Manual*, Madras, Asian Educational Service, 1990.
5. K.V. Raman, *Principles and Methods of Archaeology*, Parthajan Publications, Chennai, 1998

Books for Reference:
1. Surindranath Roy, *The Story of Indian Archaeology*, New Delhi,1961.
2. Sankalia H.D., *New Archaeology - It's Scope and Application to India*, Lucknow 1974
3. Venkataraman R., *India's Archaeology (A Survey)*
4. Webster Graham, *Practical Archaeology*
5. Wheeler R.E.M, *Archaeology in India*

COURSE CODE P8HI4003	SEMESTER-IV COURSE TITLE- HISTORY OF ENGLAND FROM 1603 A.D. TO 1945 AD	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objective:
 (i) To understand the evolution of Democracy under Early Stuarts
 (ii) To study the progress of England under Oliver Cromwell
 (iii) To Know about the condition under Later Stuarts
 (iv) To discuss about England under the Hanoverian period
 (v) To analyse the progress of England after the Industrial Revolution

Unit – I: Early Stuarts: James I and his Four Parliaments - Causes for the struggle between King and Parliament –Foreign Policy of James I - Charles I and his First Three Parliaments – Third Parliament and Petition of Rights – King's Arbitrary Rule & Measures – Long Parliament –Civil War and the execution of Charles I – Foreign Policy of Charles I

Unit – II: Oliver Cromwell and his Protectorate: The Common Wealth– The Constitutional Experiments of Cromwell – Cromwell as the Protector – Causes for the failure of Cromwell's Constitutional Experiments - Foreign Policy– The Restoration

Unit -III: Later Stuarts: Charles II and the Restoration settlement – Charles II's Second Phase Rule – The Popish Plot – Three Short Whig Parliaments – Foreign Policy of Charles II –Rebellions against James II – Causes for the Glorious Revolution: Tyrannical Rule of James II – Courses and Results of the Glorious Revolution – William III and Mary – Act of Settlement, 1701 – Foreign Policy – Queen Anne –Act of Union 1707– Foreign Policy

Unit -IV: The Hanoverian Period: George I and II – Whig Ascendency – Domestic affairs under George I – Sir Robert Walpole– Growth of Cabinet System - Pitt, the Elder - Foreign Policy of England under First Two Georges: Captain Jenkin's ear and War with Spain – The War of Austrian Succession – The Seven Years War –Personal rule of George III –American War of Independence – Napoleonic Wars
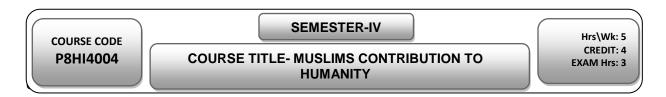
Unit – V: Industrial Revolution: The Methodist Movement – Reform Act of 1832 - George IV: Period of Reform – William IV – Reform Act of 1832 - Victorian Era 1837-1901– Chartist Movement – Reform Acts of 1867, 1884 & 1885 – Liberalism and Conservatism – Eastern Question –Parliamentary Reforms from 1932 to 1949 - England and First World War – Abdication of Edward VIII – The British Commonwealth of Nations - England and the Second World War – Sir Winston Churchill.

Books for Study:
1. Mahajan, V.D., *England Since 1688*, S. Chand, Delhi, 1963
2. George W. Southgate, *A Text Book of Modern English History*, Book One, The Tudor and Stuart Periods, J.M.Dent & Sons Ltd., London, 1938
3. Southgate, G.W., *A Textbook of Modern English History*, Vol. 1 and 2, J.M.Dent & Sons Ltd., London, 1938.
4. G.M. Trevelyan, *England under the Stuarts*, Routledge, Taylor & Francis Group, London and New York, 2002.

5. Peter Ackroyd, Foundation: *The History of England from Its Earliest Beginnings to the Tudors,* St. Martin's Griffin, New York, 2013

Books for Reference:

1. Woodward, F.L., *A History of England*, Routledge Publications, Taylor & Francis India, New Delhi, 1990
2. John Thron, *A History of England*, A.I.T.B.S. Publishers, New Delhi, 2000
3. Sir George Clark, *English History -A Survey*, Oxford University Press, Chennai, 1971.
4. Adams, G.B., *Constitutional History of England*, Jonathan Cape, London, 1920
5. Sharma, R.K., *History of England*, Sonali Publications, New Dehi, 2005

COURSE CODE P8HI4004	SEMESTER-IV	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE- MUSLIMS CONTRIBUTION TO HUMANITY	

Objectives:
(i) To impart about the importance and Practice of Knowledge in Islam
(ii) To identify the contribution of Muslims to World Science
(iii) To study about Muslim Scientists contribution to Physical Science
(iv) To discuss the progress of Maths and Astronomy through Muslim Scientist
(v) To understand the progress in the field of Humanities and Social Science

Unit- I: The Glorious period of Islamic Civilization: Introduction – Importance of Knowledge in Islam – Branches of Knowledge discussed in Quran - Renaissance before the Renaissance of Europe-Libraries

Unit - II: Contribution of Muslims to Medicine and Hospitals: Tibb-i-Nabawi – Ibn Sina (Avicenna) – Abu Al-Jarrah - Al-Razi – Ali Ibn Al-Abbas - Al-Zahravi – Al-Tabari – Abbas Ibn Firnas – Ibn Al-Nafis – Al-Kindi – Al-Walid- Bimaristan

Unit- III: Contribution of Muslims to Physical Sciences: Chemistry – Physics – Botany – Zoology – Jabir Ibn Hayyan – Zakriya Razi – Imam Jafar as Sadiq – Abul Qasimi – Al-Kindi – Al Hasan Ibn Al-Haytham Ibn Nahsiyah – Al Asmai – Al-Jahiz

Unit- IV: Muslims contribution to Astronomy and Mathematics: Al-Khawarizmi – Al-Farghani – Ibn Younus – Ibn Al-Shatir – Al-Biruni – Ibn Al-Haytham – Omar Khayyam -

Unit – V: Muslims contribution to Social Science: Al-Masudi – Al-Kindi – Ibn Al-Jazzar – Al-Tamimi – Al-Masihi – Ali Ibn Ridwan – Muhammad Al-Idrisi – Ahmed Ibn Fadlan-Ibn Khaldun

Books for Study:

1. Philip K. Hitti, *History of the Arabs,* Macmiillan, 1984.
2. Abdur Rahim Khan, *Muslim Contribution to Science and Culture,* New Delhi, 1946.
3. Ehsan Masood, *Science and Islam – A History,* London, 2009.
4. Dr. Major Syed Shahabuddeen, *Muslims Contribution to Humanity,* Chennai, 2016.
5. Arnold, Sir Thomas, *The Legacy of Islam*, London, 1913.

Books for Reference
1. Browne, E.G., *History of Arabian Medicine*, Cambridge,1921.
2. Doughty, C.M., *Travels in Arabian Desert*, London, 1953.
3. Gibb, H.A.R., *Islamic Society and the West*, London, 1960.
4. Haskins, C. H., *Arabic Science in Western Europe*, 1925.
5. Syed Ameer Ali, *The Spirit of Islam*, New Delhi, 1922.

COURSE CODE P8HIEP41	SEMESTER-IV COURSE TITLE- GROWTH OF PANCHAYATI RAJ INSTITUTIONS IN INDIA (WITH SPECIAL REFERENCE TO TAMIL NADU)	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objectives:
1. To study the history of the evolution of Local Self Government
2. To know the progress towards Local Self Government after Independence
3. To highlight about Tamil Nadu prior to Tamil Nadu Panchayat Act 1994.
4. To discuss the salient features of Tamil Nadu Panchayat Act 1994
5. To understand the Powers of Finance Commission and State Election Commission

Unit-I: Evolution: Introduction-Genesis and Growth of Self -GoverningVillage Institutions in Ancient India- Local Self -Government under the Imperial Cholas-Decline- Revival in British Period-Lord Mayo and Financial Decentralization-Lord Ripon and Local Self -Government

Unit-II: Progress After Independence: Mahatma Gandhi and Local Self -Government-Balwant Rai Mehta Committee-Ashok Mehta Committee -L.M. Singhvi Committee -Sarkaria Commission-73rd Constitutional Amendment Act

Unit-III: Prelude to Tamil Nadu panchayat Act 1994: Article 40-Madras Village Panchayat Act 1950-Tamil Nadu District Municipalities Act 1950-Tamil Nadu Panchayat Act 1958-Tamil Nadu District Development Councils Act1958.
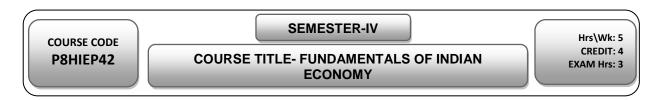
Unit-IV: Tamil Nadu Panchayat Act 1994: Salient Features-Powers and functions of Gram Sabah, Village Panchayat, Panchayat Union and District Panchayat

Unit-V: Finance Commission and State Election Commission: Finance Commission-Powers and Functions- State Election Commission: Powers and Functions-District planning Committee: Powers and Functions- Critical Evaluation of Tamil Nadu Panchayat Act 1994

Books for Study:
1. Goel, S.L.Shalini Rajneesh: *Panchayati Raj in India, Theory and practice*, Deep&Deep Publications PVT. Ltd., New Delhi, 2003
2. Malcom Adhiseshiyah: *Decentralized Planning and Panchayati Raj*, Concept Publishing Company, New Delhi, 1994
3. Palanidurai, G. Vallinayagam, K.Chidambaram, N.S. Subramanian, K: *A Hand Book for Panchayati Raj Administration (Tamil Nadu),* Concept Publishing Company, New Delhi, 2007

4. Palanidurai.G., *Power to the powerless, A study on panchayat Raj Act*.
5. Palanidurai.G. *The New Panchayat Raj Act*

Books for Reference:
1. Rathiesh Retnam, *Local Government in Mediveal Tamil Nadu*, Ajantha Achagam, Madurai, 2000.
2. Pillay K.K - *History of Local self - Government in Tamil Nadu*
3. Saraswathi S. - *Development of Rural Administration in Tamil Nadu*
4. State Institute for panchayat administration, Govt. of Tamil Nadu - *A Review- A Manual for panchayat Administration in Tamil Nadu.*
5. Venkata Rao R. - *History of local self- Government in the Madras Presidency*

COURSE CODE P8HIEP42	SEMESTER-IV COURSE TITLE- FUNDAMENTALS OF INDIAN ECONOMY	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objectives:
(i) To understand the means of measuring Economic Development
(ii) To study the importance of Planning
(iii) To know about the significance of Indian population
(iv) To discuss the Progress in Agriculture and Industry
(v) To analyse the need for reforms

Unit– I: Measuring Economic Development: Approaches to economic development and its measurement – Sustainable development: Role of State, market and other institution: Indicators of development – Human Development Index (HDI), Gender Development Index (GDI).

Unit – II: Planning: Meaning, types, origin – Indian Five -Year Plans; Objectives, strategies, financing – Targets, Achievements and failures.

Unit – III: Demographics: Broad demographic features of India's population; Rural – Urban migration; Urbanization and civil amenities; Poverty and Inequality

Unit – IV: Agriculture and Industry: Land Reforms in India; Technological changes in agriculture – Pricing of agricultural inputs and output – Industrial Policy; Public sector enterprises and their performances; Problem of sick units in India; Privatization and disinvestments debate.
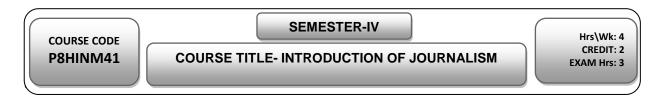
Unit – V: Reforms: Rationale of internal and external reforms; Globalization of Indian economy; WTO and its impact on the different sectors of the economy – Financial sector reforms – Fiscal Reforms.

Books for Study:
 1. Ahluwalia, I.J. and I.M.D Little (Eds), *India's Economic Reforms and Development (Essays in honour of Manmohan Singh)*, Oxford University Press, New Delhi, 1999.

2. Bardhan, P.K., *The Political Economy of Development in India*, Oxford University Press, New Delhi, 1999.
3. Chakravarty, S., *Development Planning: The India Experience*, Oxford University Press, New Delhi, 1989.
4. Daniwala, M.L., *Dilemmas of Growth: The India Experience*, Sage Publications, New Delhi, 1994.
5. Agrawal, A.N., *Indian Economy*, Vikas Publishing House, New Delhi.

Books for Reference:
1. Alak Ghosh., *Indian Economy*, The World Press, Kolkatta.
2. Rudar Datt & Sundaram., *Indian Economy*, S.Chand & Co.
3. Sankaran, S. Dr., *Indian Economy*, Margham Publications, Chennai.
4. Seth, M.L.,*Theory and Practice of Economic Planning*, S.Chand & Co.,
5. Shiva Ramu, *Globalization, The Indian Scenario*, S. Chand & Co.,

COURSE CODE P8HINM41	SEMESTER-IV COURSE TITLE- INTRODUCTION OF JOURNALISM	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3

Objectives:
(i) To understand the basic concepts of Journalism
(ii) To study the evolution and legal procedures of Journalism
(iii) To familiarize the actions relating to News gathering
(iv) To acquire the skills concerning to Editing
(v) To obtain a practical training in writing News Items

Unit – I
Nature and Scope: Definitions of Journalism- Functions and Duties of Journalism- Types of Journals- Democracy and Journalism- Freedom of press

Unit – II
Establishment & Evolution: Procedures for establishment- Administrative functions-Career opportunities in Journalism- Press Legislations- Growth of Indian and Tamil Press-

Unit-III
News and News Reporting: Definition of News- News Gathering- Role of News agencies- Importance of Interviews- Types and Nature of News reporting-

Unit- IV
Editing: Editor-News Editor- Sub Editor- Reporter- Anatomy of Editing-Language and style- Headlines- Design and makeup

Unit-V
Practical: Reporting a news story-Writing news features-Writing a column-Writing an editorial on current themes- Writing a story on developmental issues

Books for Study:

(i)   Ahuja, A.N. *Theory and Practice of Journalism*, Surjeet Publication, Delhi,1984.
(ii) Chalapathi Rau, M. *The Press*, National Book Trust, India, New Delhi,1973.
(iii) Kamath M.V. *The Journalists Hand Book*, Vikas Publishing House Ltd., New Delhi, 1983.
(iv) Kamath M.V. *Professional Journalism*, Vikas Publishing House Ltd., New Delhi,1981.
(v) Natarajan. J. *History of Indian Journalism*, Publication Division, New Delhi,1955.

Books for Reference:

(i)   Bruce Westley, *News Editing*, Oxford& IBH Publishing co., 1968.
(ii) Eari Newsom, D, *The News Paper*, Prentice Hall, New Jersey,1981.
(iii) Markekar, D.R., *The Press under Pressure*, Indian Book Company, New Delhi,1973.
(iv) Sarkar, R C.S. *The Press in India*, S. Chand& Co, New Delhi,1984.
(v) Stein, M.L. *How to be a Journalist*, Pyramid Books, New York, 1985.

Objective;

To provide an in-depth understanding of the accounting principles and Financial Statements

UNIT I- Introduction

Accounting Concepts – Accounting Conventions – Objectives of Accounting – Rules – Journal – Ledger – Subsidiary Books (purchases book, sales book, purchase return book, sales return book and cash books only)

UNIT II- Depreciation

Trial Balance – Depreciation – need for depreciation – Straight line and Written Down Value Method of Charging depreciation only.

UNIT III- Final Accounts

Preparation of trading, profit & loss account and balance sheet.

UNIT IV- Single Entry System

Accounting from Incomplete records (Excluding Conversion Method).

UNIT V- Issues of Shares

Issue of Shares at par –Issue of shares at premium - Issue of shares at discount– Forfeiture of shares - Re-issue of Forfeited Shares.

Proportion of Marks: Problems 80% and Theory 20%

Books for study:

1. Reddy & Murthy – Financial Accounting, Margham Publications,
2. R. L. Gupta & V.K. Gupta- Principles and practice of Accountancy, Sultan Chand & Sons
3. K. Murugadoss, M. Jaya, V. Charullatha, D. Baskar – Financial Accounting-Volume I, Vijay Nicole Imprints Private Limited, Chennai.
4. Grewel T. S – Introduction to Financial Accounting
5. Jain S.P – Introduction to Financial Accounting

Books for Reference:

1. Gupta R.L and Radhaswamy –Advanced Accountancy, Sultan Chand &Sons
2. M. C. Shukla & T. S. Grewal –Advanced Accountancy, Sultan Chand & Sons

Objective:

To make the students understand the decision making process in planning, scheduling and control of production and operation function.

UNIT I-Introduction

Production — production management – objectives of production management – Functions and scope of production management- production system – Relationship of production with other functional areas.

UNIT II –Production planning and control

Production Planning and Control – Routing and Scheduling – Dispatching – Maintenance Management – Types of maintenance – Breakdown – Preventive – Routine.

UNIT III-Plant Location and layout

Plant Location – Introduction – Need for selecting a suitable location – Advantages of Urban, Sub-urban and rural location – Factors influencing plant location.
Plant layout – Objectives – Principles of plant layout – Factors influencing plant layout – Types of Plant layout.

UNIT IV- Work Study and Time Study

Work Study – importance of work study – Work Study procedures – Introduction to method study – Objectives of method study – Steps involved in method study.
Work measurement or Time study – Objectives of work measurement – Techniques of work measurement

UNIT V- Quality Control

Quality Control – Importance- Types of inspection – Centralized and Decentralized Inspection – P Chart – X chart - TQM.

Books for study:
1. Saravanavel P and Sumathi S – Production and Materials Management, Margham Publications
2. Paneerselvam – Production and Operation Management, Prentice Hall of India
3. Aswathappa K – Production & Operations Management, Himalaya Publishing House
4. Pradeep Kumar & Kedar Nath – Production Management, Prentice Hall of India

Books for Reference:
1. Martland T. Tels and-Production Management, S Chand& Co
2. Shree Kanungo : Production and Operation Management, Kalyani Publishers
3. Sharma Gagan Deep, Gurshamji singh, Harpeeth Singh-Production and operation management, Kalyani Publications

COURSE CODE **U8BA3003**	SEMESTER-III COURSE TITLE – STRATEGIC MANAGEMENT	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objectives:
To impart knowledge about the importance of strategic management processes.
To focus on how firms formulate, implement and evaluate business strategies.

UNIT I- Introduction

The business system – objectives of the business – mission – vision- goals – strategic analysis of functional areas – production – marketing – human resources – finance – analyzing corporate capabilities – SWOT.

UNIT II- Corporate Strategy

Corporate strategy – nature and scope – process of strategic planning – formulation of strategy – project life cycle – portfolio analysis – BCG matrix – GE matrix – strategic decision making – business level sub strategies.

UNIT III- Generic strategic alternatives

Generic strategic alternatives – horizontal, vertical diversification – active and passive alternatives.

UNIT IV- External growth strategy

External growth strategy – merger acquisition – amalgamation – joint venture – Strategic organizational structure – line and staff function – evaluation of organizational structure – management of change.

UNIT V- Implementation of strategy

Implementation of strategy – elements of strategy – leadership and organizational climate – planning and control of Implementation.

Books for study:

1. Dr. C. B. Memoria & Dr. Satish Memoria - Business planning and policy, Himalaya Publishing House
2. L.M. Prasad- Strategic Management, Sultan Chand & Sons
3. Dr. S. Sankaran, Strategic Management, Margham Publications.

Books for Reference:
1. S. C. Bhattacharya - Strategic Management Concepts and Cases S. Chand & Co
2. Azhar Kazmi - Strategic Management & Business Policy, Tata Mc Graw Hill,
3. Gupta, Gollakote and Srinivasan – Business Policy and Strategic Management, Prentice Hall of India,
4. Saloner and Shepard – Strategic Managent, John Wiley
5. Fred R. David-Strategic Management and Cases –Prentice Hall of India

Objective:
To familiarize students about business through internet.

UNIT I: INTRODUCTION

E-Business – Definition & Meaning – Features – Needs – Advantages :– To Consumers – To Business – To Society – To Nation – Limitations – Traditional Vs Electronic Business – E-Business Vs E- Commerce.

UNIT II: E-BUSINESS CATEGORIES

Business to Business – Business to Consumer – Consumer to Business – Consumer to Consumer -   Business to Employees – Business to Government – Intra Business.

UNIT III: Electronic Data Interchange (EDI)

Meaning of EDI – Importance – Objectives – Benefits – Process – Types of EDI Files – EDI and Internet.

UNIT IV: NETWORKING

Meaning of Network – Networking – Classifications: – LAN – WAN – MAN-Internet – Meaning – Uses – Applications: – E-Mail – World Wide Web – HTML – HTTP.

UNIT V: E- PAYMENT & E- SECURITY

Meaning of E-Payment – Benefits – Popular Methods – Smart Cards – Advantages – E-Security – Meaning – Security Threats – Security Protection.

Books for study:
1. Dr K Abirami Devi & Dr M Alagammai – E-Commerce – Margham Publications.
2. Dr C. S Rayudu – E-Commerce & E- Business, Himalaya Publishing House
3. U. S. Pandey, Rahul Srivastava, Saurabh Shukla – E-Commerce and its Applications, S.Chand & Co, 2007
4. Srinivasa Vallabhan, E-Commerce, Vijay Nicole Imprints P Ltd.,
5. P Rizwan Ahmed, E-Commerce & E-Business, Margham Publications

Books for Reference:
1. P. T. Joseph, Electronic Commerce – Prentice Hall of India

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Objective:

   To make students understand the various tools and techniques like Linear Programming problems, transportation problems, assignment problems, game theory, Job sequencing used in business decision making.

UNIT I- Introduction

Operations Research – Various models – Applications and Scope – Merits and Demerits, Linear Programming Problem (LPP) – Characteristics – Formulation – Graphical Method of solving LPP – Simple Problems.

UNIT II- Assignment and Transportation Problems

Assignment Problems – Transportation Problems – Degeneracy – Methods of finding Initial Basic Feasible Solution – Simple Problems.

UNIT III- Game Theory

Game Theory – Value of Game – Optimum Strategy – With Saddle Point – Without Saddle Point – Dominance Rule – Graphical Method of solving Game – Simple Problems.

UNIT IV- Sequencing Problem

Sequencing Problem – Processing 'n' jobs through two machines – Processing 'n' jobs through three machines – Replacement Models – Situations – Replacement of items whose efficiency deteriorates with time – Simple Problems.

UNIT V- Networking

Networking – Critical Path Method (CPM) – Problem Evaluation and Review Technique (PERT) – Basic differences between PERT and CPM – Construction of Network Diagrams – Rules – Simple Problems.
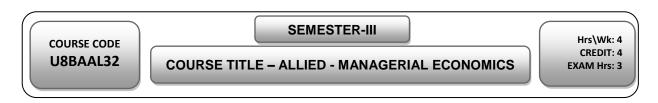**PROPORTION OF THEORY& PROBLEM: 20:80**

Books for study:
   1. Vittal - Operations Research – Margham Publications.
   2. Anand Sharma- Operations Research - Himalaya Publishing House
   3. Gurusamay S, Elements of Operations Research – Vijay Nicole Imprints P Ltd.,

Books for Reference:
   1. J K Sharma -Operations Research – MacMillan.

COURSE CODE U8BAAL32	SEMESTER-III	Hrs\Wk: 4
	COURSE TITLE – ALLIED - MANAGERIAL ECONOMICS	CREDIT: 4
		EXAM Hrs: 3

Objective:
This course is intended to provide a basic foundation on the principles of managerial economics and to demonstrate the application of economic theory to business decisions.

UNIT I- Introduction
Definition of Economics – Important concept of Economics – Basic Economic Problem – Relationship between Micro and Macro Economics.
Managerial Economics - Nature and Scope of Managerial Economics - Objectives of the Firm.

UNIT II- Demand and Utility Analysis
Theory of Consumer Behavior – Meaning of Demand – Law of Demand – Types of Demand – Determinants of Demand – Elasticity of Demand – Demand Forecasting.

UNIT III- Production and Cost Analysis
Production and Cost Analysis – Law of Returns to Scale and Economies of Scale – Cost Analysis – Different Cost Concepts – Cost and Output Relationship – Short run and Long run Costs - Revenue Curves of Firms – Supply Analysis.

UNIT IV- Market Structure
Market Forms – Market Structure – Basis of Market classification – Perfect Competition – Monopoly – Monopolistic competitions – Duopoly – Oligopoly -Price determination.
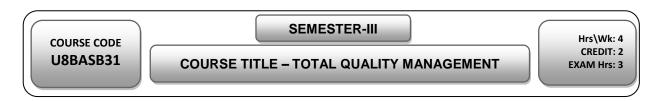
UNIT V- Pricing Methods and Strategies
Pricing Methods and Strategies – Objectives – Factors – General Considerations – Methods of Pricing – Role of Government in pricing – Dual Pricing – Price Discrimination.

Books for study:

1. R. L. Varshney and K. L. Maheshwari: Managerial Economics, Sultan Chand &Sons,2007
2. R. Veerappan & Saroj Kumar: Managerial Economics, Thakur Publishers,2013
3. H. L. Ahoja: Managerial Economics, S. Chand,2008
4. S. Sankaran: Managerial Economics, Margham Publications
5. T. Aryamala, Managerial Economics, Vijay Nicole Imprints P Ltd., Chennai.

Books for Reference:

1. M.L.Jhingan and J.K.Stephen, Managerial Economics, Vrinda Publications
2. Yogesh Maheshwari –Managerial Economis, Prentice Hall of India.
3. Dean- Managerial Economics, Prentice Hall of India
4. V.Lokanathan ,Principles of Economics and Economic Analysis, S.Chand

COURSE CODE **U8BASB31**	**SEMESTER-III** **COURSE TITLE – TOTAL QUALITY MANAGEMENT**	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3

OBJECTIVE

To acquaint the student with the basic concept of Total Quality from design assurance to service assurance, to give emphasis on International Quality Certification System – ISO 9000

UNIT I: Introduction

Basic concept of Total Quality – Evaluation of TQM – Cost of Quality – Quality Productivity – Components of TQ Loop.

UNIT II: Quality Planning and Quality Council

Strategic planning – steps in strategic quality planning – Annual quality improvement programme – Quality council- objectives of the quality council- Activities of quality council- Factors contributing to councils effectiveness.

UNIT III: Process Capability Studies

Process Capability Studies – Humanistic Aspects of TQM – Management of Quality Circle and ZD Programs.

UNIT IV: Quality Tools

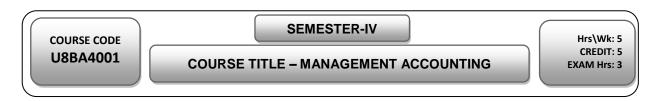Q-7 Tools – Taguchi Loss Function – Failure Analysis – Just In Time (JIT) – JIT Pull System – JIT Purchase.

UNIT V: Total Productive Maintenance

Optimum Maintenance Decisions – Total Productive Maintenance - Process Design – Buyer Seller Relations.

Books for study:
1. Subburaj, Total Quallity Management– Tata McGraw Hill.
2. Shridhara Bhat, TQM –Himalaya Publications.

Books for Reference:
1. Sandeep Malhotra – Quality Management Planning, Deep and Deep 2006
2. Ansari, A and Modarress – JIT Purchasing, Free Pass, New York.

Objective:

To explain the way in which accounting information can be used by the managers in performing their managerial functions of planning and controlling.

UNIT I-Introduction

Meaning – Definition – Objectives of Management Accounting – Advantages and Limitations of Management Accounting – Differences between Management Accounting and Financial Accounting – Financial Statements – Tools for analysis of financial statement (only Theory)

UNIT II Ratio Analysis

Ratio Analysis – Meaning- Uses –Limitations of Ratios- Liquidity ratio - Profitability ratio- Turnover ratio -Solvency Ratio.

UNIT III- Fund flow and Cash flow Analysis

Fund Flow Analysis – Meaning – Uses- Limitations –Calculation of Fund from operation- Preparation of Schedule of Changes in Working Capital – Preparation of Fund Flow Statement.
Cash Flow Analysis – Meaning – Uses – Limitations –Calculation of Cash from operation – Preparation of Cash Flow Statement.

UNIT IV-Budgets and Budgetary Control

Budgetary Control – Meaning – Objectives – Advantages and Limitations of Budgetary Control – Production Budget - Purchase Budget- Flexible Budget -Cash Budget.
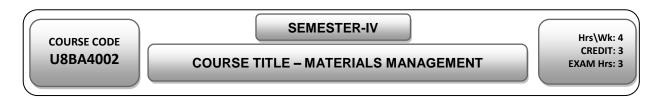
UNIT V- Marginal Costing

Marginal Costing – Uses and Limitations of Marginal Costing –Cost-Volume-Profit (CVP) Analysis –Marginal Cost Equations –Contribution-Break Even Analysis –Profit Volume Ratio-Margin of Safety.
Weight age of Marks: 80% Problems and 20% Theory.

Books for study:

1. Reddy T.S & Hari Prasad Reddy –Management Accounting, Margham Publications
2. A. Murthy and S. Gurusamy- Management Accounting Theory & Practice, Vijay Nicole Imprints Private Limited, Chennai.
3. Maheshwari S.N.—Management Accounting, Sultan Chand &Sons
4. Pillai and Bhagavathi—Management Accounting, S. Chand & Co

Books for Reference:

1. M. Y. Khan & P. K. Jain-Management Accounting, Tata Mc Graw Hill
2. S.P Gupta, Management Accounting , Sahitha Bhawan
3. Dr. M. Wilson: Management Accounting, Himalaya Publishers

COURSE CODE U8BA4002	SEMESTER-IV COURSE TITLE – MATERIALS MANAGEMENT	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

Objective:

To make the students understand the decision making process in planning, purchasing materials and to understand the inventory control techniques.

UNIT I- Introduction

Materials – Meaning – Types – Materials Management – Definition and Function – Importance – Integrated Material Management – The Concept – advantages.

UNIT II- Inventory Control

Inventory Control – Function of Inventory – Importance – Tools of Inventory Control – ABC – VED – FSN Analysis – EOQ and EBQ . (Only Theory).

UNIT III- Purchasing of Materials

Purchase Management – Purchasing Procedure – Dynamic Purchasing – Principles – Import Substitution – International Purchase – Import Procedure.

UNIT IV- Store Keeping

Store Keeping – Objectives – Functions and Responsibilities of Store Keeper – Stores Planning – Centralized Store and Decentralized Store– Bin cards – Stock cards- Security Measures – Protection and Prevention of Stores from Fire and other Hazards - Material Handling Equipments.
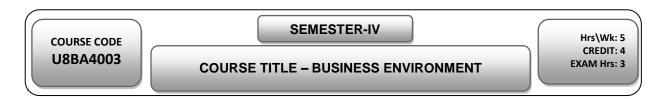
UNIT V- Vendor System

Vendor Rating –Criteria's –Buyer and Seller Relationship- Guidelines for Improving Buyer and Seller Relationship.

Books for study:
1. Gupta & Sharma – Management of System, MacMillan India Ltd.
2. M.M Varma – Materials Management, Sultan Chand and Sons
3. P Sarvanavel and Sumathi- Production and Material Management, Margham Publishers
4. Krishna Roy – Material Management, Kalyani Publishers.

Books for Reference:
1. Gopala Krishnan: Material Management, Prentic Hall of India
2. Dutta: Integrated Materials Management
3. England and Leenders: Purchasing and Materials Management

| COURSE CODE | SEMESTER-IV | Hrs\Wk: 5 |
| **U8BA4003** | **COURSE TITLE – BUSINESS ENVIRONMENT** | CREDIT: 4 EXAM Hrs: 3 |

Objective:

To provide an understanding of the role of business in society and to relate the impact of Environment on Business in an integrative manner.

UNIT I- Introduction

The concept of Business Environment – its nature and significance – Brief overview of Political , Cultural, Legal, Economic and Social Environment and their impact on business and strategic decisions.

UNIT II- Political Environment

Political Environment – Government Policy towards Pollution Control – Government and Business relationship in India – Provisions of Indian constitution pertaining to business.

UNIT III- Social Environment

Social Environment – Cultural heritage – Social attitude – Impact of foreign culture, Caste and Communities – Joint Family System – Linguistic and Religious Groups

UNIT IV- Economic Environment

Economic Environment – Economic System and their Impact of Business – Macro Economic Parameters like GDP – Population – Urbanization – Per Capita Income and their impact on business decisions.

UNIT V- Financial Environment

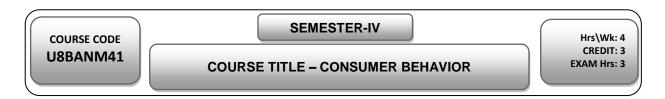Financial Environment – Financial System – Commercial Banks – RBI –IDBI –Non-Banking Financial Companies (NBFC).

Books for study:
1. Dr. C.D. Balaji – Business Environment, Margham Publications, Chennai.
2. Dr. Sankaran : Business Environment, Margham Publishers,2012
3. Aswathappa: Business Environment. Himalaya Publishers
4. Aswathappa K: Legal Environment in Business, Himalaya Publications
5. Dhanbakiyam & Kavitha M : Business Environment, Vijay Nicole Imprints Pvt Ltd., Chennai
6. Rosy Joshi – Business Environment, Kalyani Publishers.

Books for Reference:
1. M. Adhikary , Economic Environment of Business, Sultan Chand & Sons
   Francis Chrunilam : Buiness Environment, Himalaya Publlications

COURSE CODE U8BANM41	SEMESTER-IV	Hrs\Wk: 4
	COURSE TITLE – CONSUMER BEHAVIOR	CREDIT: 3 EXAM Hrs: 3

Objective:

To understand the role of consumer behaviour in marketing and to identify qualitative and quantitative methods of measuring consumer behaviour.

UNIT I - INTRODUCTION

Meaning–definition- significance – scope of consumer behaviour- need for studying consumer behaviour- stages in the development of consumer behaviour- buying motives-

UNIT II - CONSUMER BEHAVIOR MODELS

Industrial and individual consumer behaviour models - Howard- Sheth, Engel – Kollat Webstar and wind consumer behaviour Models – Implications of the models on marketing decisions

UNIT III- INTERNAL INFLUENCES

Psychological Influences on consumer behaviour – motivation – perception – personality- Learning and Attitude- Self Image and Life styles – Consumer expectation and satisfaction.

UNIT IV- EXTERNAL INFLUENCES

Socio-Cultural, Cross Culture - Family group – Reference group – Communication - Influences on Consumer behaviour

UNIT V- PURCHASE DECISION PROCESS

Consumer involvement- types of involvement- purchase of high involvement decision – purchase of low involvement decision - distinguish between high and low involvement decision making- - post-purchase behaviour.

Books for study:

1. Dr. L. Natarajan : Consumer Behaviour, Margham Publications
2. S. Ramesh Kumar: Consumer Behaviour, Pearson Education
3. Vanaja M & Roselin : Consumer Behaviour, Vijay Nicole Imprints Pvt Ltd., Chennai

Books for Reference:

1. David J. Loudon and Albert J Della Bitta : Consumer Behaviour, Tata McGraw Hill Publishing Company
2. Schifman & Kanuk : Consumer Behaviour
3. Bennet & Kasarijan : Consumer Behaviour

COURSE CODE U8BAAL41	**SEMESTER-IV** **COURSE TITLE – ALLIED-ORGANISATIONAL BEHAVIOUR**	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objective:

To describe specific theories related to group, leadership, organizational change and organizational culture which will help students to evaluate methods of motivating and rewarding individuals and group.

Unit-I- Introduction

Organizational Behavior - Meaning - Importance - Factors Influencing Organizational Behavior - Environmental Factors - Constraints Over Organization and Managerial Performance.

Unit-II- Group Behaviour

Meaning of Group and Group Dynamics - Reasons for the Formation of Groups - Characteristics of Groups - Types of Groups in Organization - Group Decision Making Process - Small Group Behavior

Unit-III-Leadership and Motivation

Leadership Concept - Characteristics - Leadership Effectiveness
Motivation - Importance - Motivators - Financial and Non-Financial - Theories of Motivation. (Maslow's & Herzberg's, McGregor's only)

Unit-IV- Organizational Change and Development

Management of Change: Meaning - Importance - Resistance to Change - Causes - Dealing With Resistance To Change - Factors Contributing to Organizational Change - Organizational Development - Meaning and Process.
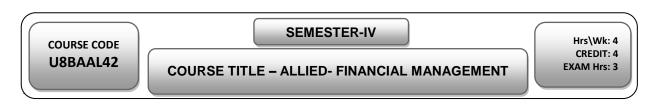
Unit-V- Organizational Culture and climate

Organizational Culture - Concept - Distinction between Organizational Culture and Organizational Climate - Factors Influencing Organizational Culture - Morale

Books for study:
1. Aswathappa. K. –Organizational Behavior, HPH, Mumbai
2. Sundar K & Srinivasan J- Organisational Behaviour, Vijay Nicole Imprints Pvt. Ltd., Chennai.
3. J. Jayasankar, S. S. Khanka- Organizational Behavior, Margham Publications
4. Dr. C. D. Balaji – Organizational Behavior, Margham Publications

Books for Reference:
1. Rao, VSP and Narayana - Organizational Theory and Behavior,Konark Publisher (P) Ltd.
2. LM Prasad – Organizational Theory and Behavior ,Sultan Chand & Sons
3. Sekaran Uma - Organizational Behavior, John Wiley
4. Robbins, P. Stephen –Organizational Behavior-Concepts, Pearson Education, 2008
5. Luthans Fred- Organizational Behavior, Mc Graw Hill, 2001

Objective:
  To familiarize oneself with the techniques used in financial management.

UNIT I - Introduction

Finance – Financial Management – Finance Function – Nature and Scope – Objectives – Interpretation and Analysis of Financial Statements – Tools – Kinds – Limitations – Objectives.
Forecasting – Financial Planning and Control – Factors – Objectives.

UNIT II – Working Capital Management

Current Assets Management – Components – Cash Management– Receivables Management – Inventory Management –Current Liabilities Management – Components – Size and Sources Working Capital Finance –Factors – Sources – Dangers of inadequacy – Regulations – Tandon Committee – Chore Committee.

UNIT III –Long Term Capital Management

Long Term Capital Management – Sources – Shares and Debentures Cost of Capital – Significance – Classifications – Problems in determining – Basic Concepts – Cost of Equity Capital – Methods – Cost of Retained Earnings.

UNIT IV - Capital Structure

Capital Structure – Significance – Factors in Capital Structure Decision – Features of Optimum Capital Structure.
  Leverage –Meaning -Financial Leverage – Operating Leverage –Composite Leverage-Distinction between Financial Leverage and Operating leverage. Simple Problems.
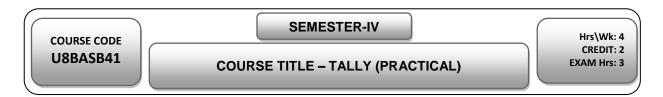
UNIT V – Capital Budgeting

Definition of Capital Budgeting – Importance –Factors influencing Capital Expenditure Decisions – Methods of Capital Budgeting – Pay Back Period Method, Accounting Rate of Return, Net Present Value Method, Internal Rate of Return Method. Simple Problems.
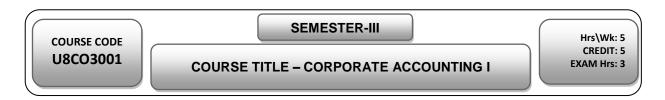
Note: Theory 60% and Problem 40%

Books for study:
  1. A. Murthy, Financial Management, Margham Publications, Chennai.
  2. I M Pandey, Financial Management, Vikas Publishing House,
  3. Prasanna Chandra, Fundamentals of Financial Management, Tata Mc Graw Hill,2008
  4. S. N. Maheshwari ,Financial Management, Sultan Chand & Sons,2007

Books for Reference:
  1. Khan & Jain, Financial Management, Tata Mc Graw Hill, 2008
  2. P. V. Kulkarni, Financial Management, Himalaya Publishing House
  3. S. C. Kuchhal, Financial Management, Chaitnaya Publishing House.

1. Create a Company Name
2. How to create a primary group? Explain with your own examples.
3. Create Ledger with your own entries from the books already available.
4. Explain how to create Voucher entries.
5. Explain how to remove Voucher entries.
6. Maintain purchase and sales register.
7. Explain how to create stock category.
8. Explain how to create backup and restore the data.
9. Print the Trial Balance.
10. Print Trading Account, Profit and Loss Account and Balance Sheet.

Objective: To give comprehensive understanding of accounting aspects relating to corporate situations / requirements.

Unit – I: Issue of Shares and Debentures (15 Hours)

Issue of Shares and Debentures - Various kinds - Forfeiture - Re-issue - Underwriting – Buyback of Shares by the Companies – Employee Stock Option.

Unit – II: Redemption of Preference shares and Debentures (15 Hours)

Redemption of Preference Shares and Debentures - Profits Prior to Incorporation.

Unit – III: Final Accounts of Joint Stock Companies (15 Hours)

Company Final Accounts as per Revised Schedule VI (Managerial Remuneration Excluded).

Unit – IV: Business Combination and Corporate Restructuring (15 Hours)

Business Combination and Corporate Restructuring - Amalgamation – Absorption as per Indian Accounting Standards (IAS- 14) (Excluding Intercompany Holdings)

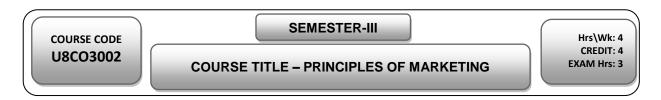**Unit – V: Alteration and Internal Reconstruction of Share Capital (15 Hours)**

Alteration of Share Capital – Internal Reconstruction and Revaluation of Share Capital.

Note: Weightage of marks: Theory 20% and Problems 80%

Books for Study:

1. **Shukla M.C, Grewal T.S, Gupta S.C**, Advanced Accounts, S. Chand & Co. Ltd., New Delhi.
2. **Reddy T.S & Murthy A**, Corporate Accounting, Margham Publications, Chennai.

Books for Reference:

1. **Jain S.P & Narang K.L** Advanced Accounting, Kalyani Publishers, Delhi.
2. **Maheshwari S.N. & Maheshwari S.K**, Corporate Accounting, Vikas Publication, New Delhi.
3. **Gupta R.L & Radhaswamy M** Advanced Accountancy, Sultan Chand & Sons, New Delhi.

COURSE CODE U8CO3002	SEMESTER-III COURSE TITLE – PRINCIPLES OF MARKETING	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objective: To provide insights into the subjects thereby make the students understand about overall aspects of principles of marketing.

Unit - I: Introduction (12 Hours)

Market - Marketing – Importance – Functions – Differences between Marketing and Selling – Marketing Mix – Marketing Environment – Micro and Macro Environmental Factors.

Unit – II: Consumer Behaviour and Market Segmentation (12 Hours)

Consumer Behaviour – Consumer buying process – Factors influencing Consumer Behaviour.

Market Segmentation – Concept – Importance – Bases of Segmentation – Target Market.

Unit – III: Product (12 Hours)

Meaning and Concept – Product Classifications - Product Life Cycle – New Product Development – Product Mix.

Unit – IV: Pricing and Distribution (12 Hours)

Price – Pricing Policies –Factors influencing pricing decision – Different Methods of Pricing. Channels of Distribution – Meaning and Importance – Types – Factors affecting choice of Distribution Channel.
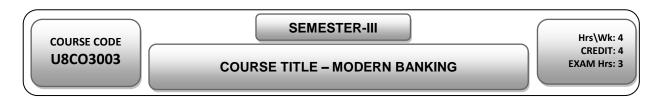
Unit – V: Promotion (12 Hours)

Promotion – Nature – Importance - Promotion Tools – Advertising – Personal Selling – Public Relations – Sales Promotion – Promotion Mix – Factors affecting Promotion Mix Decisions.

Books for Study:

1. **R.S.N. Pillai & Bagavathi,** Modern Marketing, S. Chand Co. Ltd., New Delhi.
2. **J. Jaysankar,** Marketing, Margham Publications, Chennai.

Books for Reference:

1. **Philip Kotler & Gary Armstrong**, Principles of Marketing, Pearson Education India Limited.
2. **Dr. R.L. Varshney & Dr. S.L. Gupta**, Marketing Management, Sultan Chand & Sons, New Delhi.
3. **J.C. Gandhi,** Marketing Management, Tata McGraw Hill, Noida.

Objective: To keep abreast the students the latest developments in the field of Banking and Financial System.

Unit- I: Banking (12 Hours)

Introduction – Importance of Banking - Banking system in India - Types of Banks - Functions of Commercial Banks – Role of Commercial Banks in Economic Development - All India Development Banks (AIDB) – IFCI – IDBI – ICICI.

Unit – II: Bankers and Customers (12 Hours)

Bankers and Customers - Definitions - Relationship between Bankers and Customers – Obligations of a Banker - Negotiable Instruments – Dishonour of a Cheque – Liability of a Paying Banker and Collecting Banker – Banking Ombudsman.

Unit – III: Central Banking System (12 Hours)

Central Bank - RBI – Traditional, Promotional and Supervisory Functions – Techniques of Credit Control – Quantitative and Qualitative Credit Control Techniques.

Unit – IV: Recent Trends in Banking (12 Hours)

Recent Trends in Banking - Kiosk Banking **-** Online banking – transactional and non-transactional applications of online banking – ATM – Services offered at ATMs – Cash Deposit Machine (CDM) – Electronic Data Interchange (EDI) – Benefits of EDI –Electronic Fund Transfer at Point of Sale – (EFTPOS) – Electronic Payment Services – E-Cheques – ECS (Electronic Clearing System) - RTGS, NEFT, SWIFT - Debit cards, Credit cards and Smart cards.
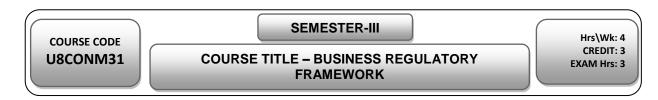
Unit – V: Technological Developments in Banking (12 Hours)

E-Banking – Introduction – Meaning – Functions of e-Banking – Benefits - E-Commerce in Banking – Hi-tech Banking – Core Banking – Corporate Banking – Rural Banking –NRI Banking – Retail Banking - Mobile Banking - Tele-banking.

Books for Study:

1. **B. Santhanam,** Banking and Financial Services, Margham Publications, Chennai.
2. **Prof. D. Mureleedharan**, Modern Banking Theory & Practice, Asoke K. Ghosh,
3. PHI Learning Private Limited, New Delhi.

Books for Reference:

1. **K.P.M. Sundaram, E.M. Sundram**, Modern Banking, Sultan Chand & Sons Ltd., New Delhi.
2. **Prof. D. Surya Chandra Rao**, Banking Reforms in India, Regal Publications, New Delhi.
3. **Dr.V.Balu**, Banking and Financial System, Sri Venkateswara Publications, Chennai.

Objective: To enable the students to gain basic knowledge of law relating to Contracts, Agency, Sale of Goods Act and Common Carriage of goods.

Unit –I: Indian Contract Act, 1872 (12 Hours)
Contract – Meaning –Definition-Characteristics – Classification of Contracts - Essential Elements of a valid Contract - Offer – Types – Essentials of valid offer – Essentials of valid acceptance – Revocation of an offer and acceptance – Consideration – meaning – Essentials and legal rules for a valid consideration.

Unit – II: Capacity to Contract (12 Hours)
Capacity to Contract – Who are competent and not competent to contract – Minor – Law relating to minor – Persons disqualified by the law – Free consent – Void agreements.

Unit – III: Discharge of contract and Indemnity and Guarantee (12 Hours)
Discharge of contract - Modes – Remedies for Breach of Contract - Quasi Contract – Features – Types - Indemnity and Guarantee – Meaning – Kinds of Guarantee – Rights of Surety – Discharge of surety.

Unit – IV: Bailment, Pledge and Contract of Sale of Goods (12 Hours)
Bailment – Essentials – Kinds – Duties and rights of Bailor and Bailee – Finder of lost goods – Rights and duties of finder of lost goods – Pledge – Essentials – Rights and duties of Pawnor and Pawnee – Sale of goods Act 1930 – Essentials of Contract of Sale – Sale and Agreement to Sell.
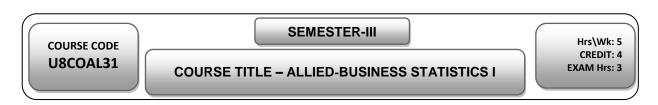
Unit – V: Contract of Agency and Carriage of Goods Act (12 Hours)
Law of Agency – Essentials of Agency – Kinds of Agent - Irrevocable agent - Duties and Rights of Agent- Duties and Rights of Principal – Termination of Agency – The Carriage of Goods Act – Duties of a Common carrier – Rights – Liability – Common Carrier Vs. Private Carrier.

Books for Study:

1. **N.D.Kapoor,** Business law, Sultan Chand & Sons, New Delhi.
2. **R.S.N.Pillai & V.Bagavathi,** Business Law, S.Chand & Co. Ltd., New Delhi.

Books for Reference:

1. **P.Saravanavel and S.Sumathi,** Business Law, Eswar Press, Chennai.
2. **K.R.Bulchandari,** Business Law, Himalaya publishing house, New Delhi.
3. **Individual Bare Acts**.

<table>
<tr><td rowspan="2">COURSE CODE
U8COAL31</td><td align="center">SEMESTER-III</td><td rowspan="2">Hrs\Wk: 5
CREDIT: 4
EXAM Hrs: 3</td></tr>
<tr><td align="center">COURSE TITLE – ALLIED-BUSINESS STATISTICS I</td></tr>
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Objective: To acquaint students with statistical tools and techniques used in business decision making.

Unit I: Introduction to Statistics & Data Collection (15 Hours)

Statistics – Features - Functions – Limitations – Scope in business – Stages in a statistical survey – Collection of data – Census and Sampling modes of enquiries – Sampling methods – Primary data – Advantages & Disadvantages – Methods of collecting Primary Data – Secondary Data – Advantages & Disadvantages – Sources of Secondary Data.

Unit II: Data Organisation &Presentation (15 Hours)

Classification – Bases - Tabulation – Types of Tables – Parts of a Table – Formation of frequency distribution - Graphical and Diagrammatic presentation of data using Bar Diagram, Pie Diagram, Histogram and Frequency Polygon.

Unit III: Measures of Central Value (15 Hours)

Measures of Central Value – Arithmetic Mean - Weighted Arithmetic Mean – Median– Mode – Geometric Mean – Harmonic Mean.

Unit IV: Measures of Dispersion & Skewness and Probability (15 Hours)

Measures of Dispersion –Range - Standard Deviation – Variance – Coefficient of Variation. Measures of Skewness – Karl Pearson's Coefficient of Skewness - Concept (Theory Only) of Kurtosis – Probability - Addition Theorem and Multiplication Theorem (Proof of the theorem excluded) - Problems. (simple problems only in Probability)

Unit V: Operations Research (15 Hours)

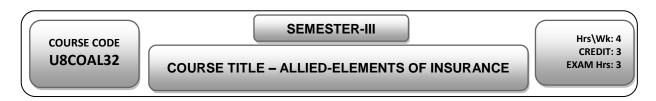Operations Research -Objectives- Characteristics – Scope – Phases – Models – Linear Programming Problem – Formulation – Solution by Graphic method.
Note: Weightage of marks: 40%Theory and 60%Problems

Books for Study:

1. **S.P. Gupta, P.K. Gupta and Manmohan,** Business Statistics and Operations Research, Sultan Chand & Sons, New Delhi.
2. **P.R. Vittal,** Business Statistics and Operations Research, Margham Publications, Chennai.

Books for Reference:

1. **S.P. Gupta,** Statistical Methods, Sultan Chand & Sons, New Delhi.
2. **Morris Hamburg,** Statistical Analysis for decision making, Harcourt Trade publishers.
3. **Hamdy A. Taha,** Operations Research: An Introduction, Pearson Education India.

| COURSE CODE **U8COAL32** | **SEMESTER-III** **COURSE TITLE – ALLIED-ELEMENTS OF INSURANCE** | Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3 |

Objective: To make the students understand the basics, importance and benefits of different types of insurance.

Unit – I: Introduction (12 Hours)
Insurance - Meaning - Definition – Features – Functions – Types–Principles – Advantages– Role of Insurance in Economic Development — FDI in Insurance Sector – Benefits of FDI in Insurance Sector – IRDA – Role – Objectives – Functions – Significance.

Unit – II: Life Insurance (12 Hours)
Life insurance - Meaning - Definition – Features – Objectives – Principles- Individual Plan and Group Insurance Plan – ULIPs - Policy Condition and Privileges – Lapses and Revivals

Unit – III: Fire Insurance (12 Hours)
Fire Insurance - Meaning – Features – Scope – Hazards in Fire Insurance – Procedure for taking a Fire Insurance Policy – Kinds of Fire Insurance Policies – Surveys and Inspection – Reinsurance – Renewals.

Unit – IV: Marine Insurance (12 Hours)
Marine Insurance - Meaning – Principles – Kinds – Fundamental Principles – Functions of Marine Insurance.

Unit – V: Claims (12 Hours)
Claims – Meaning - Claims for Life, Fire and Marine Insurance - Surrender Value and Loans – Settlements.

Books for Study:

1. **A.Murthy,** Elements of Insurance, Margham Publications, Chennai.
2. **Varma&Agarwal,** Insurance, Forward Publishing Company, New Delhi.

Books for Reference:

1. **M.N.Mishra& S.B. Mishra,** Insurance Principles and Practice, S.Chand & Co Ltd., New Delhi.
2. **P. Periasamy,** Principles and Practice of Insurance, Himalaya publishing house, New Delhi.
3. **Harringtone,** Risk Management & Insurance, Tata McGraw Hill Publishing, New Delhi.

Objective: To impart basic theoretical and practical knowledge in Accounting using Tally Software.

Unit - I: Introduction to Tally (12 Hours)

Introduction to Tally – Advantages of Tally Accounting - Salient features of Tally – General Features - Accounting Features – Inventory Features.

Unit – II: Journal, Ledger & Trial Balance (12 Hours)

Passing Journal Entries in Accounting (Excluding Adjustment Entries) – Preparing Ledger Accounts and Trial Balance.

Unit – III: Company Creation & Management (12 Hours)

Creating company – Data Path for storing and retrieving tally data - Altering and Deleting Company – Shutting Company - Gateway of Tally and User Interface

Unit – IV: Creating Ledgers & Groups (12 Hours)

Understanding Ledgers – Creating Ledgers-Creating Multiple Ledgers – Altering and Deleting Ledgers

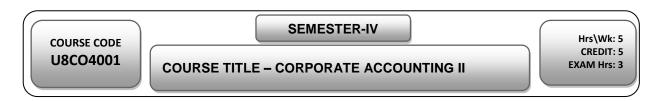Understanding Groups – Creating Groups – Altering and Deleting Groups.

Unit – V: Voucher Entry (12 Hours)

Introduction to Vouchers –Types of Vouchers - Predefined Vouchers – Creation and Alteration of Vouchers – Cancellation and Deletion of Vouchers (Excluding Inventory Vouchers) - Passing Entries in Tally – Ledger – Trial Balance.

Books for Study:

1. **S. Palanivel,** Tally - Accounting Software, Margham Publications, Chennai.
2. **Asok K Nadhani,** Tally ERP 9 Made Simple: Basic Financial Accounting, BPB Publications, New Delhi.

Books for Reference:

1. **A.K. Nadhani & K.K. Nadhani,** Tally 9, BPB Publications, New Delhi.
2. **Kogent Learning Solutions Inc.,** Tally ERP 9 in Simple Steps, DreamTech Press Inc.New Delhi.
3. **Shraddha Singh, Navneet Mehra,** Tally ERP 9 – Power of Simplicity, V & S Publishers, New Delhi.

Objective: To give comprehensive understanding of accounting aspect relating to corporate situations/ requirements.

Unit – I: Valuation of Goodwill and Shares (15 Hours)

Valuation of Goodwill – Need - Methods - Average profit, Super profit, Annuity and Capitalization Methods. Valuation of Shares – Need - Methods – Net Assets, Yield and Fair Value Methods.

Unit – II: Liquidation Accounting (15 Hours)

Liquidation Accounting – Statement of Affairs and Deficiency Account - Order of Payment – Liquidator's Final Statement of Account.

Unit –III: Accounts of Banking Companies (15 Hours)

Accounts of Banking Companies - Rebate on Bills Discounted – Non-Performing Assets (NPA) - Preparation of Profit and Loss Account and Balance Sheet with Relevant Schedules (New Method).

Unit – IV: Accounts of Holding Companies (15 Hours)

Accounts of Holding Companies - Minority Interest – Cost of Control – Unrealized Profits – Bonus Shares – Consolidated Balance Sheet (Inter Company Investment excluded)

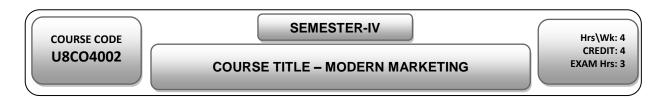## Unit – V: Accounts of Insurance Companies (15 Hours)

Insurance Company Account - Accounts of Life Insurance Business – Preparation of Final Accounts – Revenue Accounts – Profit and Loss Accounts – Determination of Net Liability – Accounts of General Insurance Companies – Preparation of Final Accounts.

Note: Weightage of marks: Theory 20% and Problems 80%

Books for Study:

1. **Shukla M.C, Grewal T.S, Gupta S.C,** Advanced Accounts, S. Chand & Co. Ltd., New Delhi.
2. **Reddy T.S & Murthy A,** Corporate Accounting, Margham Publications, Chennai.

Books for Reference:

1. **Jain S.P & Narang K.L,** Advanced Accounting, Kalyani Publishers, Delhi.
2. **Maheshwari S.N. & Maheshwari S.K,** Corporate Accounting, Vikas Publication, New Delhi.
3. **Gupta R.L & Radhaswamy M,** Advanced Accountancy, Sultan Chand & Sons, New Delhi.

COURSE CODE U8CO4002	**COURSE TITLE – MODERN MARKETING**	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objective: To enable student understand marketing in a modern scenario.

Unit – I: Modern Marketing (12 Hours)
Meaning – Features – Benefits – Approaches to the study of Marketing - Marketing Concepts - Modern Marketing Concept.

Unit – II: Marketing Research (12 Hours)
Meaning and Concept – Importance - Marketing Research Process – Challenges to Marketing Research – Management Information System.

Unit – III: Sales Management (12 Hours)
Meaning – Functions – Sales Manager – Qualities of Sales Manager – Sales Forecasting – Types – Factors influencing Sales Forecasting.

Unit – IV: Branding and Packaging (12 Hours)
Branding – Meaning – Advantages and Disadvantages – Brand Positioning and Brand Image.
Packaging – Meaning – Objectives – Role and Functions – Essentials of Good Packaging.
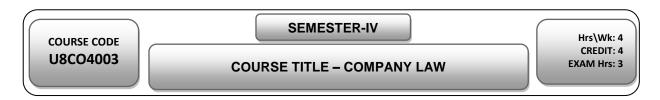
Unit – V: E-Marketing (12 Hours)
Meaning – Features – Benefits - Traditional Marketing vs E-Marketing – Direct Marketing – Services Marketing – Green Marketing.

Books for study:

1. **R.S.N.Pillai &Bagavathi,** Modern Marketing**,** S. Chand & Co. Ltd., New Delhi.
2. **J. Jaysankar,** Marketing, Margham Publications, Chennai

Books for Reference:

1. **Philip Kotler & Gary Armstrong,** Principles of Marketing, Pearson Education India Limited.
2. **Roberto G. Mendia,** Principles of Marketing, Rex Printing Company.
3. **Rajan Nair,** Marketing, Sultan Chand & Sons, New Delhi.

COURSE CODE	SEMESTER-IV	Hrs\Wk: 4
U8CO4003	**COURSE TITLE – COMPANY LAW**	CREDIT: 4
		EXAM Hrs: 3

Objective: To understand the legalistic procedures relevant to formation and running of corporate bodies.

Unit-I: Introduction to the Companies Act, 2013 (12 Hours)

Company – Definition – Characteristics – Distinction between Company and Partnership - Kinds of Companies – Distinction between Public Company and Private Company – Incorporation of a Company - Promoters - Meaning, Kinds, functions, duties and liabilities of promoters.

Unit-II: Memorandum of Association, Articles of Association and Prospectus (12 Hours)

Memorandum of Association – Meaning – Contents - Alteration - Articles of Association – Meaning - Contents - Alteration. Prospectus – Meaning – Definition - Content- Misstatements- Liability for Misstatements – Statement in lieu of Prospectus.

Unit-III: Shares and Debentures (12 Hours)

Shares – Meaning – Types of Shares – Provision for issue of shares – Allotment – Calls – Forfeiture – Alteration of share capital – Debentures – Meaning – Types of Debentures.

Unit-IV: Company Directors and Company Secretary (12 Hours)

Directors - Qualification and Appointment of Directors – Powers, Duties and Liabilities of a Director - Removal of Director – Retirement of Director - Types of Directors – Women Directors. Company Secretary – Qualification - Appointment – Duties – Liabilities - Functions.
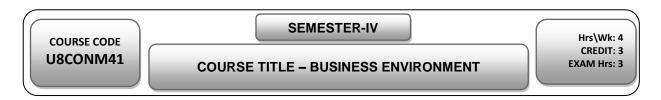
Unit-V: Company Meetings and Winding up of a Company (12 Hours)

Meeting – Meaning – Essentials of a Valid Meeting – Types of Meetings – Resolution and its Type – Minutes. Winding Up of a Company – Compulsory Winding up – Voluntary Winding Up – Winding up under the Supervision of the Court.

Books for Study:

1. **N.D.Kapoor**, Company Law & Practice, Sultan Chand & Sons, New Delhi.
2. **J. Santhi,** Company law (As per Companies Act, 2013), Margham Publications, Chennai.

Books for Reference:

1. **A.K. Mujumdar,** Dr. D.K. Kapur, Company Law & Practice, Taxmann's, New Delhi.
2. **Vijay Gupta, K.G.Garg,** Company Law, Kalyani Publishers, New Delhi.
3. **P.K.Ghosh, V.Balachandran,** Company Law & Practice, Sultan Chand & Sons, New Delhi.

Objective: To make the students understand importance of business environment and help them to realize their role towards business and society.

Unit- I: Introduction (12 Hours)

Business Environment - Meaning – Definition – Objectives- Characteristics – Features - Types of Environment –Differences between Micro Environment and Macro Environment - Business Goals – Social Responsibility of Business.

Unit- II: Economic Environment (12 Hours)

Economic System - Meaning– Characteristics – Functions– Types of Economic System: Capitalism – Socialism – Mixed – Merits and Demerits.

Unit- III: Social and Cultural Environment (12 Hours)

Social Environment - Corporate Social Responsibility (CSR) – Arguments in favour of CSR – Arguments against CSR - Business Ethics - Meaning – Types – Need – Guidelines for Business Ethics - Cultural Environment - Impact of Culture on Business – Peoples' Attitude to Business and Work.

Unit-IV: Political Environment and Legal Environment (12 Hours)

Political environment - Importance -Political Factors affecting Business – Legal Environment - Legislation for Consumer Protection – The Consumer Protect Act, 1986 – Rights of Consumers under The Consumer Protection Act, 1986 – Consumer Redressal Agencies – Powers of Consumer Redressal Agencies.
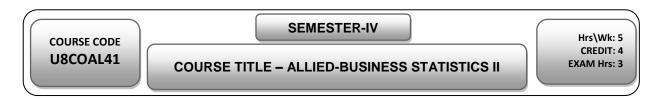
Unit- V: Global Environment (12 Hours)

Global environment – International Relations – Types – Approaches to International Relations MNC's – Merits and Demerits – Foreign Direct Investment (FDI) – Importance – Pros and Cons of FDI.

Books for study:
1. *S.Sankaran*, *Business Environment, Margham Publications, Chennai.*
2. *Dr. Francis Cherunilam*, *Business Environment, Himalaya Publishing House,New Delhi.*

Books for Reference:
1. *K.Aswathappa,* *Essentials of Business Environment, Himalaya Publishing House, New Delhi.*
2. *ShaikhSaleem,* *Business Environment, Kindersly India (P) ltd., New Delhi.*
3. *Keith Davis William, C.Frederik ,* *Business and Society, McGraw Hill International Books Co., New Delhi.*

COURSE CODE U8COAL41	SEMESTER-IV COURSE TITLE – ALLIED-BUSINESS STATISTICS II	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objective: To acquaint students with statistical tools and techniques used in business decision making.

Unit - I: Correlation & Regression Analysis (15 Hours)

Correlation – Uses – Types – Karl Pearson's Correlation coefficient – Spearman's Rank Correlation coefficient – Concurrent Deviation method.Regression Analysis – Uses – Distinction between Correlation and Regression – Obtaining Regression Equations using Actual Mean Method - Concept (theory only) of Standard Error of Estimate.

Unit - II: Index Numbers (15 Hours)

Index Numbers – Uses – Methods of Constructing Index Numbers – Simple Aggregate Method – Simple Average of Relatives Method – Weighted Aggregative Index Numbers – Laspeyres' Method – Paasche's Method – Fisher's Ideal Method – Weighted Average of Relatives method - Time Reversal Test – Factor Reversal Test – Consumer Price Indices - Concept (theory only) of Chain Index Numbers, Base Shifting, Deflating and Splicing.

Unit - III: Time Series Analysis (15 Hours)

Time Series – Utility – Components – Methods of determining Trends – Free Hand Method – Method of Semi Averages – Method of Moving Averages – Method of Least Squares – Measurement of Seasonal Variations using Method of Simple Averages.

Unit - IV: Introduction to Statistical Quality Control &Business Forecasting (15 Hours)
(Theory only)

Statistical Quality Control - Need - Advantages – Limitations – Methods - Control Chart – Meaning – Uses - Overview of different types - Acceptance Sampling –Role. Business forecasting – Role – Limitations - Steps – Overview of various methods.

Unit - V: Transportation and Assignment Problems (15 Hours)

Transportation Problems – Obtaining IBFS using North West Corner Rule, Least Cost Method and VAM – Unbalanced Transportation Problems (Degeneracy, Maximisation and Optimality problems excluded). Assignment Problems – Hungarian Assignment Method – Unbalanced Assignment Problems (Maximisation problems excluded) - Restricted or Prohibited Assignments.
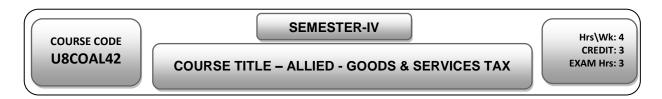
Note: Weightage of marks: 30%Theory and 70%Problems

Books for Study:
1. **S.P. Gupta, P.K. Gupta and Manmohan,** Business Statistics and Operations Research, Sultan Chand & Sons, New Delhi.
2. **P.R. Vittal,** Business Statistics and Operations Research, Margham Publications, Chennai.

Books for Reference:

1. **S.P. Gupta,** Statistical Methods, Sultan Chand & Sons, New Delhi.
2. **Morris Hamburg,** Statistical Analysis for decision making, Harcourt Trade publishers.
3. **Hamdy A. Taha,** Operations Research: An Introduction, Pearson Education India.

COURSE CODE **U8COAL42**	**SEMESTER-IV** **COURSE TITLE – ALLIED - GOODS & SERVICES TAX**	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

Objective: To impart theoretical knowledge of fundamentals of GST.

UNIT – I: Introduction to Taxation (12 Hours)
Concept of Tax – Objectives of Taxation – Canons of Taxation – Classification of Taxes – Direct Taxes and Indirect Taxes – Merits, Limitations and Differences – Single Tax System & Multiple Tax System – Concept, Merits, Limitations and Differences.

UNIT – II: Introduction to Goods & Services Tax (12 Hours)
Meaning of GST – Objectives of GST - Scope of GST – Salient Features of GST Model – Advantages and Limitations of GST – Impact of GST and its Implications on Indian Economy Industry and Sectorwise Impact of GST in India – Impact of GST on Central and State Govenments – SWOT Analysis of GST in India – Worldwide GST – Types of GST in India – CGST, SGST, IGST and UTGST – GST Rates – Exemptions under GST.

UNIT – III: Important Definitions in CGST Act, 2017 (12 Hours)
Address of Delivery u/s 2(2) – Audit u/s 2(13) – Authorised Representative u/s 2 (15) – Capital Goods u/s 2(19) – Casual Taxable Person u/s 2(20) – Central Tax u/s 2(21) – Common Portal u/s 2(26) – Composite Supply u/s 2(30) – Continuous Supply of Goods u/s 2(32) – Continuous Supply of Services u/s 2(33) – Council u/s 2(36) – Electronic Cash Ledger u/s 2(43) – Exempt Supply u/s 2(47) – Goods u/s 2(52) – Integrated Tax u/s 2(58) – Mixed Supply u/s 2(74) – Person u/s 2(84) – Place of Business u/s 2(85) – Principal Supply u/s 2(90) – Reverse Charge u/s 2(98) – Supplier u/s 2(105) – Taxable Person u/s 2(107) - Turnover in State u/s 2(112) – Union Territory u/s 2 (114).

UNIT IV: Exempted Goods and Services & Concept of Supply (12 Hours)
Exemption by Issue of Notification u/s 11(1) – Exemption by Special Order u/s 11(21) – Goods Exempt from GST – Services Exempt from GST – Concept of Supply under GST – Scope of Supply – Self Supplies – Time of Supply of Goods – Time of Supply of Services – Inter State Supplies – Intra State Supplies.

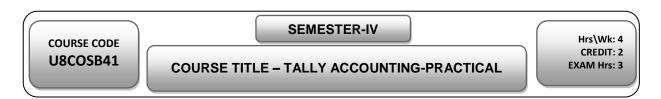**UNIT V: Levy and Collection of GST (12 Hours)**
Provisions relating to Levy and Collection of CGST – Composite Supply and Mixed Supply – Input Tax Credit – Concept of E-Way Bill.

Books for Study:
1. **T.S. Reddy and Y. Hari Prasad Reddy,** Business Taxation (Goods & Services Tax), Margham Publications, Chennai.
2. **V.S. Datey, Taxmann's GST Ready Reckoner,** Sixth Edition, 2018, New Delhi.

Books for Reference:
1. **Bare Law on GST Act(s) and Rule(s)** – Third Edition, August 2018, The ICAI, New Delhi.
2. **Pritam Mahure,** GST in India (e-book), Seventh Edition, September 2018, Download Source: www.gstindia.com
3. **Vishal Thakkar, GST for the Layman,** CNBC Pub. Co. Ltd., New Delhi.

COURSE CODE **U8COSB41**	**SEMESTER-IV**	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3
	COURSE TITLE – TALLY ACCOUNTING-PRACTICAL	

Objective: To impart theoretical and practical knowledge in Accounting & Tax using Tally Software.

Unit - I: Final Accounts (12 Hours)
Introduction – Preparation of Trading and Profit & Loss a/c – Balance Sheet. -Final Accounts in Tally.

Unit - II: Receivables and Payables Management (12 Hours)
Introduction – Meaning – Activating Bill Wise Details - Purchase Entries – Sales Entries – Purchase Return – Sales Return – Receipt & Payment Entries.

Unit – III: Budgetary Control (12 Hours)
Budget – Budgetary Control – Meaning – Creation of Budgets – Group Budgets – Budget Ledgers – Alteration of Budgets – Deletion of Budgets.

Unit-IV: Goods and Services Tax (GST) (12 Hours)
Introduction to GST – Activating GST in Tally – Setting up GST (Company Level, Ledger Level or Inventory Level) – GST Taxes & Invoices – Understanding SGST, CGST & IGST – Creating GST Masters in Tally

Unit – V: Voucher entry with GST (12 Hours)
Purchase Voucher with GST - Voucher entries   on Intra-State Purchase Entry in GST (SGST + CGST) – Voucher entries on Inter-State Purchase Entry in GST (IGST)
Sales Voucher with GST – Voucher entries   on Intra-State Sales Entry in GST (SGST + CGST) – Voucher entries on Inter-State Sales Entry in GST (IGST)

Books for Study:

1. **S. Palanivel,** Tally - Accounting Software, Margham Publications, Chennai.
2. **Asok K Nadhani,** Tally ERP 9 Made Simple: Basic Financial Accounting, BPB Publications, New Delhi.

Books for Reference:
1. **A.K. Nadhani & K.K. Nadhani,** Tally 9, BPB Publications, New Delhi.
2. **Kogent Learning Solutions Inc.,** Tally ERP 9 in Simple Steps, DreamTech Press Inc., New Delhi.
3. **Shraddha Singh, Navneet Mehra,** Tally ERP 9 – Power of Simplicity, V & S Publishers, New Delhi.

Objective: To enable the students to understand the application of advanced accounting practices in the fields of modern business.

UNIT – I: Accounting Standards and Company Final Accounts (18 Hours)

Accounting Standards - Concept – Objectives – Significance – Need for Accounting Standards – Accounting Standards in India – An overview of International Financial Reporting Standards (IFRS) - Company Final Accounts as per Revised Schedule VI.

UNIT – II: Valuation of Goodwill and Shares (18 Hours)

Valuation of Goodwill – Need – Factors affecting the Valuation – Methods of Valuation - Average Profit, Super Profit, Annuity and Capitalization Methods. Valuation of Shares – Need – Factors affecting the Valuation – Methods of Valuation – Net Assets, Yield and Fair Value Methods.

UNIT – III: Business Combination and Corporate Restructuring (18 Hours)

Business Combination and Corporate Restructuring - Amalgamation – Absorption – Calculation of Purchase Consideration as per AS 14 - Accounting Treatment in the Books of Transferor and Transferee - External Reconstruction of a Company (Inter Company Investment excluded).

UNIT – IV: Alteration of Share Capital and Internal Reconstruction (18 Hours)

Alteration of Share Capital – Internal Reconstruction – Accounting Treatment – Preparation of Financial Statements after Internal Reconstruction.

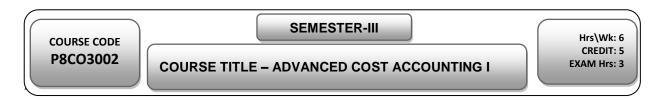**UNIT – V: Accounting for Price Level Changes (18 Hours)**

Accounting for Price Level Changes - Need and Objectives – Current Purchasing Power Method – Current Cost Accounting Method.

Note: Weightage of Marks - Theory 20% and Problems 80%

Books for Study:
   1. T.S Reddy and Murthy, Corporate Accounting – Margham Publication, Chennai
   2. M.C. Shukla and T.S Grewal, Advanced Accounts – S.Chand & Co. New Delhi.

Books for Reference:
   1. R.L Gupta and Radhasamy, Advanced Accounts – Sultan Chand & Sons, New Delhi.
   2. Jain and Narang, Advanced Corporate Accounting – Kalyani Publishers, New Delhi.
   3. S.N Maheshwari, Advanced Corporate Accounting – Vikas Publication, New Delhi.

COURSE CODE P8CO3002	SEMESTER-III COURSE TITLE – ADVANCED COST ACCOUNTING I	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objective: To impart the knowledge of advancements in Costs Accounting.

UNIT- I: Introduction (18 Hours)

Cost Accounting – Definition – Nature and Significance of Cost Accounts – Functions – objectives – Advantages and Limitations of Cost Accounting – Installation of Costing System – Costing an Aid to Management – Cost Accounting Vs. Financial Accounting – Cost unit – Cost Centre and Profit Centre – Methods of Costing – Types of Costing – Costs Sheets, Tenders and Quotations.

UNIT – II: Material Costing (18 Hours)

Material – Meaning of Material Control – Objectives of Material Control – Stock Control through ABC analysis – Standard Price – Material Inventory Control – Stock levels — EOQ – Perpetual inventory system – Methods of Pricing the Issue of Materials – FIFO – LIFO – Simple Average – Weighted Average Method.

UNIT – III: Labour Cost (18 Hours)

Labour Cost: Labour Cost Control – Labour Turnover and Methods of Measuring Labour Turnover – Methods Of Paying Wage Remuneration Including Incentive Schemes – Time Wages System, Piece Rate System, Premium and Bonus Plan – Taylor`s Differential Piece Rate System – Halsey Premium Plan – Merrick`s Multiple piece System – Rowan plan.

UNIT – IV: Overheads (18 Hours)

Overheads – Meaning – definition – Classification – Apportionment and Allocation of overheads – Methods of Reapportionments – Direct Redistribution Method – Steps Distribution Methods – Reciprocal Distribution Methods – Simultaneous Equation Method – Repeated Distribution Method.

UNIT – V: Reconciliation Statement (18 Hours)

Reconciliation of Cost and Financial Profit – Need for Reconciliation – Objectives – Reasons for Difference in Profit.

Note: Weightage of Marks - Theory 20% and Problems 80%

Books for Study:
1. Dr. Reddy & Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai.
2. Dr. A. Murthy & Dr. S. Gurusamy, Cost Accounting, Vijay Nicole Publications, Chennai.

Books for Reference:
1. S.P Jain & K.L Narang – Cost Accounting, Kalayani Publishers.
2. R.S.N Pillai & V. Bagavathi – Cost Accounting, S.Chand & Co., New Delhi.
3. Nigam & Sharma–Cost Accounting–Principles and Application, Himalaya Publishers, Delhi.

COURSE CODE P8CO3003	SEMESTER-III COURSE TITLE – ORGANISATIONAL BEHAVIOUR	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objective: To make the students understand the Psychological Aspects of an Organisation.

Unit I: Introduction (18 Hours)

Organisational Behaviour – Definition – Nature – Need - Scope – Elements – Process – Models – Foundations of Individual Behaviour – Personality – Theories of Personality– Perception –Learning – Attitudes – Values.

Unit II: Motivation (18 Hours)

Motivation – Theories by Maslow, Herzberg, McGregor, McClelland & Vroom – Motivational tools – Incentives – Job Design – MBO – Motivation and Morale - Organisational Citizenship Behaviour.

Unit III: Group Dynamics and Stress Management (18 Hours)

Group Dynamics – Group Behaviour – Characteristics and Types of Groups – Group Decision Making – Inter-Group Behaviour – Quality Circles – Work Stress – Stress Management – Coping Strategies of Stress.

Unit IV: Leadership and Organisational Conflicts (18 Hours)

Leadership – Functions – Styles – Theories – Transactional and Transformational Leadership — Organisational Conflicts – Stages – Sources – Types – Conflict Management.
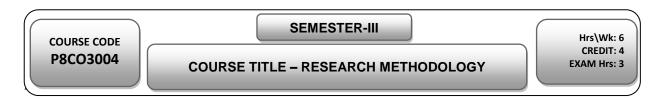
Unit V: Organisational Structure and Organisational Change (18 Hours)

Organisational Structure – Concept – Design - Organisational Culture and Climate – Power and Politics – Organisational Change – Resistance to Change – Organisational Development – Organisational Effectiveness – Organisational Ethics.

Books for Study:
   1. S.S. Khanka, Organisational Behaviour, S.Chand & Co. Ltd., New Delhi.
   2. Stephen P. Robbins, Organizational Behavior, Pearson Education, New Delhi.

Books for Reference:
   1. L.M. Prasad, Organisational Behaviour, Sultan Chand and Sons, New Delhi.
   2. Margie Parikh and Rajen Gupta, Organisational Behaviour, Tata McGraw Hill Education, New Delhi.
   3. K. Aswathapa, Organisational Behaviour, Himalaya Publishing House.

COURSE CODE	SEMESTER-III	Hrs\Wk: 6
P8CO3004	**COURSE TITLE – RESEARCH METHODOLOGY**	CREDIT: 4 EXAM Hrs: 3

Objective: To develop the attitude among the students towards Research.

UNIT I: Introduction (18 Hours)
Research – Definition - Scope - Significance –Types – Steps - Formulation of Research Problem-Research Design - Hypothesis.

UNIT II: Sampling and Data Collection (Theory Only) **(18 Hours)**
Sampling - Meaning – Definition - Need - Types - Sampling Errors. Data Collection: Primary and Secondary Data – Differences between Primary Data and Secondary Data - Procedure for Data Collection-Tools of Data Collection-Questionnaire and Interview Schedule.

UNIT III: Data Processing (Theory Only) **(18 Hours)**
Processing of Data - Editing - Coding – Tabulation –Diagrammatic and Graphical Representation of Data.

UNIT IV: Data Analysis (Both Theory &Problems) **(18 Hours)**
Data Analysis - Analysis of Quantitative Data - Descriptive statistics - Tests of Significance - Parametric Tests and Non-Parametric Tests - Chi-square Test –ANOVA - MANOVA - Application of SPSS for Data Analyses.

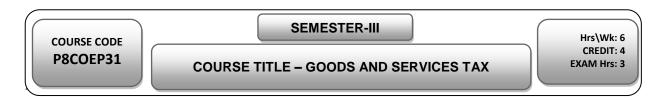**UNIT V: Report Writing** (Theory only) **(18 Hours)**
Report Writing - Significance - Different steps in writing Report - Layout of Research Report – Types -Mechanics of writing a Report.

Note: Weightage of Marks - Theory 80% and Problems 20%

Books for Study:
1. C.R.Kothari, Research Methodology: Methods and Techniques, Wiley EasternLtd., New Delhi.
2. Ravilochanan, Research Methodology, Margham Publications, Chennai.

Books for Reference:
1. D. Amarchand, Research Methods in Commerce, Emerald Publishers, Chennai.
2. Anderson, R.L., Berry H.D., Poole,M, Thesis and Assignment Writing, Wiley Eastern Ltd., New Delhi.
3. S.P.Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi.

Objective: To impart in-depth knowledge of GST and its Working Mechanism

UNIT – I: Introduction (18 Hours)

Taxation – Meaning, Objectives, Canons, Direct Taxes vs Indirect Taxes – Single Tax System & Multiple Tax System – Goods and Services Tax – Meaning, Objectives, Scope, Salient Features, Benefits and Limitations – Impact of GST on Indian Economy – Impact of GST on Central and State Governments – SWOT Analysis of GST in India - Types of GST in India – CGST, SGST, IGST and UTGST – GST Rates.

UNIT – II: Supply of Goods and Services, GST Registration & GST Records (18 Hours)

Exempted Goods and Services from GST - Concept of Supply under GST – Scope of Supply – Self Supplies – Time of Supply of Goods – Time of Supply of Services – Persons Liable for GST Registration u/s 2(22) – Persons Exempt from Registration – Compulsory Registration u/s24 – Procedure for Registration – Suo Moto Registration – Cancellation of Registration – Tax Invoice in respect of Goods – Tax Invoice in respect of Services – Contents of Tax Invoice – Delivery Challan – Credit and Debit Notes – Accounts and Records u/s 35 – Manner of Maintenance of Accounts – Procedure for Maintenance of Electronic Records.

UNIT III: Exempted Goods and Services & Concept of Supply (18 Hours)

Exemption by Issue of Notification u/s 11(1) – Exemption by Special Order u/s 11(21) – Goods Exempt from GST – Services Exempt from GST – Concept of Supply under GST – Scope of Supply – Self Supplies – Time of Supply of Goods – Time of Supply of Services – Inter State Supplies – Intra State Supplies.

UNIT – IV: GST Returns, TDS, Electronic Register, Reverse Charge, Assessment and Audit (18 Hours)

Furnishing of Returns – Monthly Return – Annual Return – Final Return – Outward Supplies – Inward Supplies – Provisions relating to TDS – Provisions relating to Electronic Liability Register – Reverse Charge Mechanism – Assessment – Meaning – Types – Self Assessment – Re-assessment – Provisional Assessement – Summary Assessment and Best Judgement Assessment. GST Audit – Definition – Audit by GST Authories – Special Audit.

UNIT V: Offences, Penalties & Prosecution, Refund, Inspection, Search & Seizure and E-Way Bill (18 Hours)

Prescribed Offences under CGST Act – Penalty and Prosecution under CGST Act – Provision relating to Refund of Tax – Power of Inspection, Search and Seizure. E-Way Bill – Meaning – Persons authorised to Generate E-Way Bill – Proforma of E-Way Bill – Cases when E-Way Bill is not Required – Validity of E-Way Bill – Documents Required for E-Way Bill Generation – Penalty in the case of Non-Generation of E-Way Bill by Transporter – Multiple Consignments in Single Vehicle – Change of Vehicle during Transit – Non-Transportation of Goods after E-Way Bill Generation – Cancellation of E-Way Bill.

Books for Study:
1. T.S. Reddy and Y. Hari Prasad Reddy, Business Taxation (Goods & Services Tax), Margham Publications, Chennai.
2. Parashar & Anuj Harshwardhan Sharma, Goods & Services Tax (GST) Law & Practice, Second Edition, Bharat Law House Pvt. Ltd. New Delhi.

Books for Reference:
1. Bare Law on GST Act(s) and Rule(s) – Third Edition, August 2018, The Institute of Chartered Accountants of India, New Delhi.
2. Pritam Mahure, GST in India (e-book), Seventh Edition, September 2018, Download Source: www.gstindia.com
3. Dr. H.C. Mehrotra, V.P. Agarwal and S.K. Batra, Goods and Services Tax, Sahitya Bhawan Publications, Agra.

COURSE CODE P8COEP32	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – MANAGERIAL ECONOMICS	

Objective: To make the students understand the application of economic tools and principles in formulating business decisions.

UNIT I: Introduction to Managerial Economics (18 Hours)

Managerial Economics – Meaning – Nature – Scope and Application – Roles and Responsibilities of a Managerial Economist. Demand – Factors influencing Demand - Law of Demand - Elasticity of demand – Demand Forecasting.

UNIT II: Production Function and Cost Concepts (18 Hours)

Production Function – Law of Returns – Law of Variable Proportions – Law of Returns to Scale – Economics of large scale operation. Cost Concepts – Cost function – Cost output relationship – Cost Control and Cost Reduction.

UNIT III: Market Structures (18 Hours)

Market Structures – Features of Perfect and Imperfect Market – Price and Output decisions under Competitive conditions – Perfect competition – Monopoly - Monopolistic Competition - Oligopoly – Price Leadership – Price Discrimination.

UNIT IV: Theories of Profit (18 Hours)

Profit – Concept – Theories – Measurement – Economic Profit Vs Accounting Profit – Profit Maximisation Vs Profit Restriction – Profit Planning and Forecasting – Cost Volume Profit Analysis – BEP Analysis.

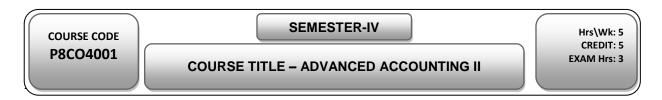**UNIT V: National Income & Business Cycle (18 Hours)**

National Income – Concept – Methods of Computation – Complexities of Measurement – Inequalities in Income – Causes, Consequences and Remedies. Business Cycle – Characteristics – Phases of Business Cycle – General Measurement to Control Business cycle – Cyclical Pricing.

Books for Study:
1. Varshney and Maheswari, Managerial Economics, Sultan Chand & Sons, New Delhi.
2. Mithani D. Managerial Economics, Himalaya Publishing House, Mumbai.

Books for Reference:
1. Mehta P.L, Managerial Economics, Sultan Chand & Sons, New Delhi.
2. Gupta G.S, Managerial Economics, Tata McGraw Hill, New Delhi.
3. Joel Dean, Managerial Economics, Prentice Hall, New York.

COURSE CODE **P8CO4001**	**SEMESTER-IV** **COURSE TITLE – ADVANCED ACCOUNTING II**	**Hrs\Wk: 5** **CREDIT: 5** **EXAM Hrs: 3**

Objective: To enable the students to understand the application of advanced accounting practices in the fields of modern business.

UNIT – I: Liquidation Accounting (15 Hours)
Liquidation Accounting – Modes - Statement of Affairs and Deficiency Accounts. - Order of Payment – Preferential Payments – Liquidator's Final Statement of Account.

UNIT – II: Holding Company Accounts (15 Hours)
Holding Company Accounts – Holding & Subsidiary Companies - Legal Definition and Requirements – Calculation of Goodwill or Cost of Control – Treatment of Unrealised Profit - Consolidation of Financial Statements as per AS 21 – Preparation of Consolidated Balance Sheet.

UNIT – III: Accounts of Banking Companies (15 Hours)
Accounts of Banking Companies: Legal Provisions – Rebate on Bills Discounted – NPA – Preparation of Profit and Loss Account and Balance Sheet. (New Format Only)

UNIT – IV: Insurance Company Accounts (15 Hours)
Insurance Company Accounts - Accounts of Life Insurance Business – Accounts of General Insurance Business – IRDA Regulations – Preparation of Final Accounts

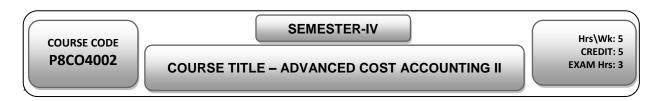**UNIT – V: Recent Developments in Accounting (15 Hours)**
Human Resource Accounting – Environmental Accounting – Social Responsibility Accounting – Accounting for Intangibles Assets (Theory only).

Note: Weightage of Marks - Theory 20% and Problems 80%

Books for Study:
1. T.S Reddy and Murthy, Corporate Accounting – Margham Publication, Chennai
2. M.C. Shukla and T.S Grewal, Advanced Accounts – S.Chand & Co. New Delhi.

Books for Reference:
1. R.L Gupta and Radhasamy, Advanced Accounts – Sultan Chand & Sons, New Delhi.
2. Jain and Narang, Advanced Corporate Accounting – Kalyani Publishers, New Delhi.
3. S.N Maheshwari, Advanced Corporate Accounting – Vikas Publication.

Objective: To make the students get expert knowledge in dealing with costing and costing techniques.

UNIT – I: Job, Batch and Contract Costing (15 Hours)
Job Costing – Batch Costing – Contract Costing – Preparation of Contract Account – Work Certified – Work Uncertified – WIP Valuation – Cost Plus Contract and Escalation Clause.

UNIT – II: Process Costing (15 Hours)
Process Costing - Meaning and Utility – Distinction between Process Costing and Job Costing - Normal Loss – Abnormal Loss – Abnormal Gain – Process Accounts

UNIT – III: Process Costing, Joint and By Products (15 Hours)
Treatment of Equivalent Production – FIFO Method - Inter Process Profit - Joint Products and By Products.

UNIT – IV: Service Costing (15 Hours)
Operating Costing in Service Industries – Meaning – Operating Cost Units – Transport Costing – Power House Costing – Hotel Industry Costing.

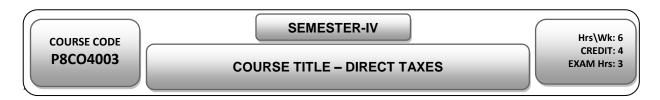## UNIT –V: Standard Costing and Variance Analysis (15 Hours)
Standard Cost & Standard Costing – Meaning – Advantages and Disadvantages – Variance Analysis - Material Cost Variance – Labour Cost Variance – Overheads Cost Variance & sales variance.

Note: Weightage of Marks - Theory 20% and Problems 80%

Books for Study:
1. Dr. Reddy & Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai.
2. Dr. A. Murthy & Dr. S. Gurusamy, Cost Accounting, Vijay Nicole Publications, Chennai.

Books for Reference:
1. S.P Jain & K.L Narang – Cost Accounting, Kalayani Publishers.
2. R.S.N Pillai & V. Bagavathi – Cost Accounting, S.Chand & Co., New Delhi.
3. Nigam & Sharma – Cost Accounting –Principles and Application, Himalaya Publishers.

COURSE CODE **P8CO4003**	**SEMESTER-IV** **COURSE TITLE – DIRECT TAXES**	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objective: To impart theoretical and practical knowledge of Income Tax so as to enable the students to do tax planning, compute taxable income and to e-file return of income.

UNIT – I: Introduction (18 Hours)
Basic Concepts – Residential Status and Incidence of Tax – Income Exempt from Tax.

UNIT – II: Income from Salary & House Property (18 Hours)
Computation of Income from Salary – Allowances – Perquisites – Deductions including Standard Deduction – Income from House Property – Annual Value – Self-Occupied House - Let-Out House – Deemed to be Let-Out House – Partly Self-Occupied and Partly Let Out – Deductions.

UNIT – III: Income from Business & Profession and Capital Gains (18 Hours)
Profits and Gains of Business and Profession – Admissible Deductions – Expenses Expressly Disallowed – Deemed Incomes – Depreciation – Block of Assets – Normal Depreciation – Additional Depreciation – Capital Gains – Short-term and Long-term Capital Gains – Exemptions.

UNIT IV: Income from Other Sources and Computation of Total Income (18 Hours)
Income from Other Sources – Aggregation of Income – Set-Off and Carry Forward of Losses – Deductions available from Gross Total Income – Computation of Total Income of Individuals.

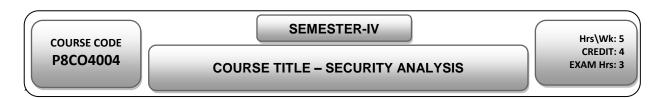## UNIT V: Assessment Procedure, e-filing of Return and Tax Planning (18 Hours)
Assessment Procedure – Methods – Assessment of Individuals – e-filing of Tax Return – Tax Planning – Meaning, Need and Limitations – Tax Evasion and Tax Avoidance.

Note: Weightage of marks: Theory 40% Problems 60%

Books for Study:
1. Gaur and Narang, Income Tax Law & Practice, Kalyani Publishers, New Delhi.
2. T.S. Reddy and Y. Hari Prasad Reddy, Income Tax Law & Practice, Margham Publications, Chennai.

Books for Reference:
1. Vinod K Singhania and Monica Singhania, Students' Guide to Income Tax including GST, Taxmann, New Delhi.
2. H.C. Mehrothra, Income Tax including Tax Planning & Management, Sahithya Bhavan, Agra.
3. R N Lakhotia and Subhash Lakhotia, How to Save Income Tax through Tax Planning, Vision Books, New Delhi.

COURSE CODE P8CO4004	**SEMESTER-IV** **COURSE TITLE – SECURITY ANALYSIS**	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objective: To imbibe the students the working knowledge on Security Analysis for the purpose of Investments

UNIT – I: Introduction (15 Hours)

Investment – Types – Speculation – Gambling – Importance of Investments – Features of an Investment Program – Kinds of risks associated with an investment – Investment related terminology – Bullish Market – Bearish Market - Market Indexes – BSE Index (BSE 100, BSE 200, BSE 500, Mid Cap, Small Cap & BSE Bankex) – CNX Index (CNX Nifty, CNX 100, CNX 500, CNX Mid Cap, CNX Defty) – Users and uses of Market Index.

UNIT – II: Security Analysis (15 Hours)

Meaning and Scope of Security Analysis – Significance – Approaches to Security Analysis - Fundamental Security analysis – Types – Economic Analysis - Industry Analysis – Company Analysis.

UNIT – III: Technical Analysis (15 Hours)

Technical Analysis – Technical vs. Fundamental Analysis – The Dow Theory – Elliot Wave Principles – Kondratev Wave Theory – Chaos Theory - Charting as a Technical Tool – Types of Charts – Limitations of charts. Efficient Market Theory – Forms of Efficient Market Hypothesis – Random Walk Theory.

UNIT – IV: Valuation of Securities (15 Hours)

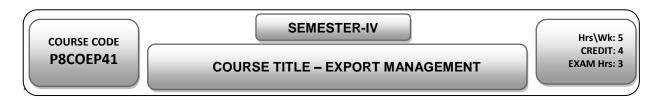Valuation of Securities – Equity Shares – Preference Shares – Bonds – Dividends – Government Securities

UNIT – V: Portfolio Analysis (15 Hours)

Portfolio Analysis – Portfolio Choice – Markowitz Portfolio Selection Model – Sharpe's Single Index Model – Capital Asset Pricing Model – Security Market Line – Capital Market Line – Estimating Beta – Beta Basics.

Books for Study:

1. V.K. Bhalla, Investment Management, S Chand & Co. Ltd., New Delhi.
2. Dr. L. Natarajan, Investment Management, Margham Publications, Chennai.

Books for Reference:

1. Dr. Ranganathan and Madhumathi R, Investment Analysis and Portfolio Management, Pearson Education, New Delhi.
2. S.Kevin, Portfolio Management, Prentices Hall of India (Pvt. Ltd) New Delhi.
3. R.P. Rustogi, Investment Analysis and Portfolio Management, Sultan Chand & Sons, New Delhi.

Objective: To create awareness about various concept, terms, procedures and avenues in Export.

UNIT-I: Introduction to Export and Registration Formalities (15 Hours)

Export – Meaning and Definition – Objectives – Features – Advantages and disadvantages of Export - Role of Export in Economy development – Protection – Definition- Advantages of protection- Arguments against protection – Tariffs and other Barriers to trade.

UNIT-II: Export Management and EXIM Policy (15 Hours)

Export Management – Meaning – Need – Features – Functions of Export Manager – EXIM Policy – Highlights of EXIM Policy.

UNIT-III: Export Pricing (15 Hours)

Export Pricing – Objectives - Factors influencing Export Pricing Decision – Steps involved in pricing- Methods of Export Pricing – Modes of Payment in Export – Advance Payment – Payment against Documents.

UNIT-IV: Export Procedures and Export market (15 Hours)

Export procedures – Export incentives available to Indian Exporters- Export market- Factors influencing transition from domestic to International business – Motivation to Exporters.

UNIT-V: Export Financing and Export Promotional Measures (15 Hours)

Export financing – Pre-shipment and Post–shipment finance- Packing credit in domestic currency- forms of packing credit in domestic currency- Cargo Insurance – Customs Clearance – Documentation Procedure - Export promotion – scope and coverage- coverage of EPCG scheme- Export obligation.

Books for Study:

1. Francis Cherunilam, International Trade & Export Management, Himalaya Publishing House, Mumbai.
2. TAS Balagopal, Export Management, Himalaya Publishing House, Mumbai.

Books for Reference:

1. Varshney & Battacharya, International Marketing, Sultan Chand & Sons, New Delhi.
2. B.S.Rathor, Export Management, Himalaya Publishing House, Mumbai.
3. D.C. Kapoor, Export Management, Vikas Publishing House, Chennai.

| COURSE CODE P8COEP42 | SEMESTER-IV

COURSE TITLE – ENTREPRENEURIAL DEVELOPMENT | Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3 |

Objective: To impart conceptual knowledge about entrepreneurship to the students so as to inspire them to start their own business.

Unit – I: Introduction (15 Hours)

Entrepreneurship - Definition – Concept – Theories – Factors Influencing Entrepreneurship. Entrepreneur - Definition – Traits – Classification of Entrepreneurs based on Type of Business and Size of Business – Clarence Danhof's Classification – Women entrepreneurs – Social Entrepreneurs –Rural Entrepreneurs - Role of Entrepreneurs in Economic Development – Challenges faced by Entrepreneurs.

Unit – II: Starting an Enterprise (15 Hours)

Identification of Business Opportunity - Idea Generation – Techniques of Idea Generation – Identification and Selection of Opportunity.Business Plan - Meaning - Significance – Formulation. Project Management - Project – Meaning – Project Appraisal – Methods of Project Appraisal – Project Report – Preparation of Project Report.

Unit – III: Role of Promotional & Developmental Institutions in Entrepreneurial Growth (15 Hours)

Functions of EDPs and ESDPs – Industrial estates – KVIC – NIESBUD – SISI – SIDCO – TCO – SIPCOT – ITCOT – DIC – NSIC – SIDO – NSDC– TIDCO–CFTI – NIMSME –EDII - PPDC - TATTI – IIC - Export-Import Bank of India .

Unit – IV: Role of Financial Institutions in Entrepreneurial Growth (15 Hours)

Financing an Enterprise – Commercial Banks – Venture Capitalists – Angel Investors – Crowdfunding – Development Banks – Financial institutions – TIIC – SIDBI – IDBI – IFCI – ICICI – SFC – IIBI.

Unit – V: Government Policies and Benefits (15 Hours)

Tax Benefits – Tax Holidays – Allowance for deducting Depreciation – Rehabilitation Allowance – Benefits available for MSMEs: PMEGP - NEEDS–UYEGP.

Books for Study
1. S.S. Khanka, Entrepreneurial Development, S. Chand & Co., New Delhi.
2. Jay Shree Suresh, Entrepreneurial Development, Margham Publications, Chennai.

Books for Reference
1. C.B. Gupta & N.P. Srinivasan, Entrepreneurial Development, Sultan Chand & Sons, New Delhi.
2. Robert D. Hisrich, Michael P. Peters & Dean A. Shepherd, Entrepreneurship, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Ravindranath V. Badi & Narayana V. Badi, Entrepreneurship, Vrinda Publications (P) Ltd., New Delhi.

Webliography:

1. Website of Ministry for Micro, Small & Medium Enterprises, Union Government of India,https://msme.gov.in/all-schemes
2. Website of Commissionerate of Industries and Commerce, Micro, Small and Medium Enterprises Department, Government of Tamilnadu,http://www.indcom.tn.gov.in/pmegp.html
3. Website of Commissionerate of Industries and Commerce, Micro, Small and Medium Enterprises Department, Government of Tamilnadu,http://www.indcom.tn.gov.in/needs.html
4. Website of Commissionerate of Industries and Commerce, Micro, Small and Medium Enterprises Department, Government of Tamilnadu, http://www.indcom.tn.gov.in/uyegp.html

COURSE CODE P8CONM41	SEMESTER-IV COURSE TITLE – COMPUTER APPLICATIONS IN BUSINESS	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3

Objective: To teach the students the use of Computers in Practical Business Situations.

UNIT I: **Introduction (12 Hours)**
Computers – Meaning - Characteristics of Computer – Computer Generations – Classification of Computers – Areas of Computer Applications – Computer Peripherals – Input Devices, Output Devices and Auxiliary Storage Devices.

UNIT II: Word Processing (12 Hours)
Meaning – Basic Word Processing Features – Microsoft Word – Features of MS Word – Working with Documents – Editing Documents – Formatting Documents – Language Tools – Working with Tables – Mail Merge – Printing a Document.

UNIT III: PPT – Power Point Presentation & Spreadsheet (12 Hours)
Presentation Tool - MS Powerpoint – Basic Features and Enhanced Features – Starting Powerpoint – Creating a Presentation Slide – Editing and Formatting Text in a Slide – Printing of Presentation. Spreadsheet: Meaning – Features – Application Areas – Microsoft Excel – Basic Features – Screen Elements – Moving Around Worksheet – Working with a Spread Sheet.

UNIT IV: Computerized Accounting (12 Hours)
Fundamentals of Computerized Accounting- Need for Computerized Accounting – Salient Features of Computerized Accounting – Advantages and Disadvantages of Computerized Accounting – Manual Accounting Vs Computerized Accounting – Problems faced in Computerized Accounting System- Computerized Accounting in Financial Accounting – Management Accounting.

UNIT V: E-Transactions (12 Hours)

Definition, Benefits and Limitations – E-Payments – Benefits and Limitations - Online Ticket Booking – Online Shopping – Online Library – Telecommunicating – Teleconferencing.

Books for Study:

1. Ananthi Sheshasaayee & Sheshasaayee, Computer Applications in Business and Management, Margham Publications, Chennai.
2. Dr. P. Rizwan Ahmed, Computer Applications in Business, Margham Publications, Chennai.

Books for Reference:

1. Kapoor VK, Computers and Information Technology, Sultan Chand & Sons, New Delhi.
2. Alexis Leon & Mathews Leon, Computer Applications in Business, Vijay Nicole Imprints Pvt.Ltd., Chennai. Peter Norton, Introduction to Computers, Tata McGraw Hill, Publishing Co., Ltd., Ne

COURSE CODE U8FA3001	COURSE TITLE – CORPORATE ACCOUNTING I	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

Objective:
To gain comprehensive understanding of all aspects relating to corporate accounting.
To a theoretical foundation for the preparation of financial statements.

UNIT – I: Introduction
Meaning of Corporate Accounting – Objectives – Distinction with other accounts -Issue of shares – at par, at premium and discount – pro-rata allotment – forfeiture and reissue of shares.

UNIT – II: Issue of debenture
Issue of debentures – redemption of debentures with and without provisions – redemption of preference shares.

UNIT – III: Acquisition of business
Acquisition of business – profit prior to incorporation – final accounts (managerial remuneration excluded).

UNIT – IV: Holding companies
Accounts of holding companies: minority interest – cost of control – unrealized profits – revaluation of assets and liabilities – bonus shares – consolidated balance sheet (inter-company investment excluded).

UNIT – V: Inflation accounting:
Inflation accounting: meaning - limitations of historical accounting – methods of accounting for price level changes – current purchasing power method – current cost accounting method – hybrid method.
Note: Weightage of marks- Problem 80% Theory 20%

Text Book:
1. Shukla M.C., Grewal, T.S. Gupta S.C. – Advanced Accounts – S.Chand & Co. Ltd, New Delhi-   2012

Books for Reference:
1. Reddy T.S. & Murthy A – Corporate Accounting – Margham Publications, Chennai-2018.

2. Gupta R.L & Radhaswamy M. – Advanced Accountancy, Sultan Chand & Sons, New Delhi-2010
3. Jain & Narang – Advanced Accountancy – Kalyani Publishers, Bangalore, 2006

| COURSE CODE | SEMESTER-III | Hrs\Wk: 4 |
| U8FA3002 | COURSE TITLE – BUSINESS MANAGEMENT | CREDIT: 3 EXAM Hrs: 3 |

Objective:
To gain the knowledge of business management and professionalize students in management.

UNIT- I: Concept of management

Concept of management - meaning and definitions - nature and characteristics of management - Process of management - management vs. administration - levels of management - importance of management and scope of management - principles of management – functions of management (POSDCORB).

UNIT - II: Planning

Planning - its nature, need, characteristics, objectives and importance of planning - types of planning - principles of planning - steps in planning process - planning premises - forecasting - decision making – features, process and importance.

UNIT- III: Organizing

Organizing - principles of organization - authority and responsibility - line and staff organization - functional organization - matrix organization - organization of charts and manual - span of control.

UNIT - IV: Delegation and decentralization

Delegation - meaning - definition of delegation authority - types of delegation - the process or the elements of delegation, assignment of duties, creation of accountability and authority-decentralization - benefits of decentralization- degrees of decentralization.

UNIT - V: Leadership

Leadership - qualities of a good leader – Distinction between Leader and Manager - Different kinds of leadership styles- co-ordination and control - problems in co-ordination - steps involved in control process.

Text Book:
1. Dr. C.B Gupta - Business Management, Sultan Chand & Sons, New Delhi-2013

Books for Reference:
1. Jayasankar,-Principles of Management, Margham Publication, Chennai-2018
2. Dr.N.Premavathy- Principles of Management, Shri Vishva Publication, Chennai-2008
3. L.M.Prasad- Principles & Practice of Management, Sultan Chand & Sons-New Delhi-1999.

Objective:
To familiarize the students with various economic concepts.
To understand the economics of business influencing in the decision making process.

UNIT- I: Introduction

Nature, scope, significance, objectives and uses of business economics– difference between economics and business economics – social responsibility of business economics.

UNIT- II: Demand and Supply Analysis

Demand analysis - law of demand – demand schedule – demand curve – exceptions to the law of demand – elasticity of demand – importance of elasticity of demand – law of supply and its determinants – Market equilibrium.

UNIT- III: Demand Forecasting
Demand forecasting – types of forecasting – factors involved in demand forecasting- methods of forecasting.

UNIT- IV: Cost, Revenue and Break even analysis
Cost concepts and classifications –different types of costs and their relations to each other – average and marginal cost – various types of revenue curves – short term and long term - diagrammatic representation. - Determination of BEP point – assumptions of break-even analysis – usefulness of break – even analysis – limitations of break – even analysis

UNIT V: Production Function
Production – Production function – iso-quants – producer's equilibrium – the law of variable proportions – law of returns to scale – economies of scale.

Text Book:
1. H.L. Ahuja, Business Economics, S. Chand & Co, New Delhi.

Reference Books:

1. K.P.M Sundaram & E.N. Sundaram - Business Economics, Sultan & Chand, New Delhi.
2. Varsheny and Maheshwari - Managerial Economics, Sultan Chand & Co, New Delhi.
3. S. Sankaran - Business Economics, Margham Publications, Chennai.

COURSE CODE U8FANM31	SEMESTER-III COURSE TITLE – MODERN BANKING	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objective:
To provide the knowledge and latest developments in the field of banking and financial system to the students.

UNIT – I: Introduction
Brief history of banking - unit banking - branch banking - structure of Indian financial system - mixed banking - functions and importance of commercial banks - credit creation of commercial banks.

UNIT – II: RBI & functions
RBI - functions - instruments of credit control - quantitative and qualitative or selective credit control.

UNIT – III: Nationalisation of commercial banks
Nationalized banks - schedule banks - commercial banks - regional rural banks.

UNIT – IV: Recent developments in banking
Recent Practices - debit card, credit card, ATM and e-banking - electronic fund transfer – electronic clearing system – PIN number.

UNIT – V: Banking Technologies.
Meaning – evolution of mobile banking - types of mobile banking services, services to retail customers, to corporate customers and to bankers – pull and push based mobile banking services – advantages and disadvantages - problems of customers of mobile banking – benefits of service qualities - future prospects of mobile banking in India.

Text Book:
1. Dr.S.Gurusamy- Banking Theory Law and Practice, Tata McGraw Hill, New Delhi-2010

Reference Books
1. Dr.V. Balu - Banking and Financial System, Sri Venkateswara Publications,Chennai-2009
2. Varshney & Maheswari, Banking Theory Law and Practice, Sultan Chand & Co, New Delhi – 2016.
3. B. Santhanam - Banking and Financial System, Margham Publications, Chennai -2018

COURSE CODE U8FAAL31	SEMESTER-III COURSE TITLE – ALLIED-BUSINESS STATISTICS I	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objective:
To understand and apply statistics tools in business and economic problems

UNIT – I: Introduction
Origin and growth of statistics – definition - functions and limitations of statistics.

UNIT – II: Collection, classification and tabulation of data
Collection of data – primary and secondary data – classification and tabulation of data.

UNIT – III: Diagrammatic and graphical representation
Diagrammatic and graphical representation of data – bar diagrams – pie diagram - pictograms and cartograms, frequency distribution.

UNIT – IV: Central tendency
 Measures of central tendency – mean, median and mode- geometric mean and harmonic mean – advantages and limitations.

UNIT – V: Measures of dispersion and skewness
Measures of dispersion – range, mean deviation, quartile deviation, standard deviation and Lorenz curve - skewness – Karl Pearson, Bowley's and Kelly's co-efficient of skewness.

Text Book:

1. R.S.N. Pillai and Bhagavathi: Statistics - Theory & Practice, Sultan Chand & Company, New Delhi- 2012

Reference Books:

1. S.P. Gupta, Statistical Methods, Sulthan Chand & Co, New Delhi 2010.
2. P.R. Vittal- Business Statistics, Margham Publication, Chennai-2018.
3. S.Sankaran: Statistics, Margham Publication, Chennai-2018.

SEMESTER-III

COURSE CODE U8FAAL32

COURSE TITLE – ALLIED- ELEMENTS OF INSURANCE

Hrs\Wk: 4
CREDIT: 3
EXAM Hrs: 3

Objective: To make the students to understand about the importance of insurance and its role in the development of the society and its constituents

UNIT - I: Introduction

Definition of insurance - evolution - features - function of insurance - primary and secondary - types of insurance - importance of insurance - to individual - to business - to society - insurance terms - differentiate between reinsurance and double insurance.

UNIT – II: Principles of insurance

Principle of utmost good faith - insurable interest - indemnity - subrogation - contribution - mitigation of losses - causa proxima.

UNIT- III: Life insurance

Meaning - advantages - procedure for effecting life insurance - principles – life policy conditions - difference between assignment and nomination - settlement procedure - maturity claims - survival benefit - death claims.

UNIT - IV: Types of insurance

General insurance - fire insurance - principles - types of fire policies - marine insurance- principles - types of marine policies - miscellaneous insurance policies - motor insurance- third party insurance - fidelity insurance - burglary insurance - credit insurance.

UNIT - V: Recent trends in insurance sector

Insurance industry in India- paradigm shift- insurance sector reforms- global players in the market- entry of banks in to insurance- challenges for insurance sector- insurance regulatory and development authority (IRDA) - objectives- duties and powers- functions- insurance ombudsman.

Text Book:
1. Murthy. A- Elements of Insurance, Margham Publications, Chennai.

Reference Books
1. Murthy .A - Principles & Practice of Insurance, Margham Publications, Chennai.
2. Dr. Premavathy, Principles & Practice of Insurance, Shri Krishana Publication, Chennai.
3. Murthy. A- Elements of Insurance, Margham Publications, Chennai.

Objective:-
To impart knowledge on various facts of electronic commerce.

UNIT- I: Introduction

Evolution – meaning - definition of E-commerce - advantages to business

UNIT- II: Scope of E-commerce

Advantages to consumer society and nation – driving forces- internet usage – growth of E-commerce in India.

UNIT- III: Internet and its applications

Tools and application of E-commerce– internet - networking, classification –internet of www – intranet & extranet - mobile commerce

UNIT- IV: E-marketing

Online shopping – advantages – disadvantages – advice to the online shopping – E-marketing mix – E marketing plan -E-advertising – E- payment – E-security.

UNIT- V: Cyber crime & law

Cyber crime – list of cybercrimes – IT Act 2000 – Formations of online contract – Cyber forensic – CERT – E – governance in India.

Text Book:
1. Soka, From EDI to Electronic Commerce, McGraw Hill, 1995.

Reference Book :
1. R. Kalakota & A.B. Whinston, Readings in Electronic Commerce, Addison Wesley, 1997
2. David Kosiur, Understanding Electronic Commerce, Microsoft Press, 1997.
3. Sailys Chan, Electronic Commerce Management, John Wiley, 1998.
4. Abirami., & Dr Alagammai., E-Commerce, Margham publications, Chennai, 2018

Objective:
To gain accounting knowledge in the Corporate Sector.

UNIT–I: Goodwill and shares
Valuation of goodwill – need – factors affecting the valuation – methods of valuation– average profit, super profit, annuity and capitalization methods. Valuation of shares - need – factors affecting the valuation – methods - net asset, yield and fair value methods.

UNIT – II: Internal reconstruction
Alteration of share capital – internal reconstruction and revaluation of share capital.

UNIT – III: Amalgamation, absorption and reconstruction
Amalgamation – absorption and external reconstruction of a company (inter-company investment excluded).

UNIT - IV: Liquidation accounting
Liquidation accounting – order of payment – preferential payments – liquidator final statement of accounts – statement of affair and deficiency accounts.

UNIT – V: Bank account
Bank account: rebate on bills discounted - preparation of profit and loss account and balance sheet with relevant schedules (new method) – non - performing assets (NPA).
Note: Weightage of marks- Problem 80% Theory 20%

Text Book:
1. Shukla M.C., Grewal, T.S. Gupta S.C. – Advanced Accounts – S.Chand & Co. Ltd, New Delhi- 2012

Reference Book:
1. Reddy T.S. & Murthy A – Corporate Accounting – Margham Publications, Chennai-2018.
2. Gupta R.L & Radhaswamy M. – Advanced Accountancy, Sultan Chand & Sons, New Delhi-2010
3. Jain & Narang – Advanced Accountancy – Kalyani Publishers, Bangalore-2006

| COURSE CODE U8FA4002 | COURSE TITLE – BANKING LAW AND PRACTICE | Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3 |

Objective:
To gain knowledge on the law and practice of banking.

UNIT- I: Banker- customer relationship

Meaning of Banker and Customer - General relation between Banker and Customer - Debtor and Creditor - Special relationship - Bailor and Bailee - Principal and Agent, Trustee and Beneficiary, Banker and Adviser - Assignor and Assignee - Rights of a Banker - Right to Set-off - Right of Lien.

UNIT - II: Special type of customers

Opening of Bank Account - Types of Accounts– Special Type of Customer - Minor, Club, Societies, Partnership, Joint Stock Companies, Joint Account, Trust, Associations - Closing of a Bank Account - Customer Grievances & Redressal cell – Ombudsman.

UNIT - III: Negotiable instruments

Negotiable instruments - meaning - features - types - cheques, promissory note, bills of exchange - cheques - features of a cheques - specimen of a cheque - material alterations.

UNIT - IV: Crossing and endorsement

Crossing of cheques - meaning - objects - types - general, special and double crossing - endorsement - meaning rules for endorsement - essentials of a valid endorsement - kinds - significance.

UNIT - V: Paying and Collecting Banker

Paying banker - role of paying banker - duties - precautions - statutory protection to the paying banker - refusal of payment of cheques, collection of cheques - collecting banker - precautions - statutory protection given to the collecting banker - negligence - duties and responsibilities of a collecting banker - procedure for collection.

Text Book:
1. Dr.S.Gurusamy- Banking Theory Law and Practice, Tata McGraw Hill, New Delhi-2010

Reference Books
1. Dr.V. Balu - Banking and Financial System, Sri Venkateswara Publications, Chennai-2009
2. K.P. Kandasamy, S. Natarajan, R. Parameswaran - Banking Law and Practice, S.Chand&Co -2009.
3. Varshney & Maheswari, Banking Theory – Law and Practice, Sultan Chand & Co, New Delhi, 2016.

COURSE CODE U8FA4003	**SEMESTER-IV** **COURSE TITLE – BUSINESS ECONOMICS II**	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objective:
To familiar the students with various economic concepts and to make them to understand the economics of business influencing the decision making process.

UNIT-I: Market Structure

Market structure and pricing - pricing under perfect competition - pricing under monopoly - pricing under monopolistic competition – pricing under oligopoly and its features.

UNIT- II: Profit concepts & theories

Accounting profit and economic profit – normal profit and super normal profit – Hawley's risk theory of profit – Knight's uncertainty theory – Clark's dynamic theory – Schumpeter's innovation theory – marginal productivity theory of profit – profit forecasting

UNIT- III: Pricing policy & methods

Pricing Policy – meaning and objectives of pricing policy – factors involved in pricing policy – pricing methods- pricing for public goods.

UNIT – IV Capital budgeting & project profitability

Need for capital – demand for and supply of capital – cost of capital - capital rationing- cost control and reduction – capital budgeting – evaluating investment proposals and project profitability.

UNIT- V: National income & government policies

Government and business - industrial policy - national income competition – concepts of national income – methods of measuring national income - national income in India - contribution.

Text Book:
1.   M.M.Gupta, Business Economics, Sindhu Publication, Bangalore, 2001.

Reference Books:
1. K.P.M Sundaram and E.N. Sundaram - Business Economics, Sultan & Chand, New Delhi,
2. S. Sankaran - Business Economics, Margham Publications, Chennai, 2018.
3. R.L. Varsheny and K.L. Maheshwari - Managerial Economics, Sultan & Chand, New Delhi.
4. H.L. Ahuja - Business Economics, S.Chand &Co., New Delhi.

COURSE CODE **U8FANM41**	**SEMESTER-IV** **COURSE TITLE – ENTREPRENEURIAL DEVELOPMENT**	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objective:
To gain knowledge about setting –up and managing a business

UNIT – I: Introduction

Meaning of entrepreneur – characteristics- functions - qualities [traits] of a true entrepreneur- entrepreneur vs. enterprise – entrepreneur vs. manager - entrepreneur vs. entrepreneurship- role of entrepreneur in economic development.

UNIT – II: Project Development

Project – classification – project life cycle- project identification- steps- project report – importance- contents- project appraisal.

UNIT – III: Small Scale Industry

Concept of SSI – Importance – problems - starting SSI - business idea – sources – identification - forms of ownership- location.

UNIT – IV: Incentives & subsidies

Meaning – objective – need – problem - incentives offered by the Government of Tamil Nadu - tax concession – assistance - marketing assistance - export assistance - technical assistance.

UNIT – V: Entrepreneurship development

Meaning of EDP – objectives – process – phases – problem - institutions for entrepreneurship development.

Text Book
1. C.B. Gupta – Entrepreneurship Development in India, Sultan Chand & Co, New Delhi-05

Reference Books

1. Jayashree Suresh – Entrepreneurial Development, Margham Publications, Chennai-18.
2. E.Gordon and K.Nataraj- Entrepreneurship Development, Himalaya Publication House, Chennai-2013
3. Vasant Desai- Entrepreneurial Development- Himalaya Publishing House, Mumbai.

COURSE CODE U8FAAL41	SEMESTER-IV COURSE TITLE – ALLIED- BUSINESS STATISTICS II	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objective:
To understand and apply statistics tools in business and economic problems

Unit – I: Sampling methods

Methods of sampling – simple random sampling – stratified random sampling – systematic Sampling – methods of economic survey.

Unit – II: Correlation

Simple correlation – Karl Pearson's co-efficient of correlation – Spearman's rank correlation (only simple problems).

Unit – III: **Regression**

Regression – regression equation - regression lines – (only simple problems).

Unit – IV: **Index number**

Index number – introduction – uses of index numbers – un weighted index number – simple aggregate method and simple average of price relative method – weighted index number – Laspyres, Paasches, Dorbish, Bowley's, Marshall, Edgeworth and Fisher's index number

Unit – V: Time series analysis

Time Series – components of time series – measurement of trends – semi average method - moving average method – method of least square – seasonal indices.

Text Book:
1. R.S.N. Pillai and Bhagavathi: Statistics Theory & Practice, Sultan Chand & Company, New Delhi- 2012

Reference Books:

1. Dr. S. P. Gupta- Statistical Methods, Sultan Chand & Sons, New Delhi- 2009
2. P.R. Vittal- Business Statistics, Margham Publication,Chennai-2018.

COURSE CODE U8FAAL42	SEMESTER-IV COURSE TITLE – ALLIED- ISLAMIC ECONOMICS	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

Objective:

To define the scope and significance with special reference to the central problems of economics choice. To explain the ethical character of Islamic Economics within the context of the current debate on economic methodology, particularly the Positive / Normative characterization of Islamic Economics.

Unit - I: Introduction
Islamic Economics: definition – nature – essentials - Conventional vs. Islamic economics -a critical review of different economic systems - Capitalism vs. Socialism and Islamic economic system.

Unit - II: Principles of Islamic economics
Prohibition of Riba - bank interest and rationale of its prohibition - prohibition of Gharar and Maysir- competition - cooperation and their relative scope - risk sharing vs. risk shifting - economic stability and the role of abolition of interest - evil effects of interest on production - allocation of resources - distribution of wealth.

Unit - III: Islamic consumer / producer behaviour
Consumer behaviour self interest with ethical constraints – producer behaviour- theory of firm- the possibility of taking social goods into consideration - public sector policy goals with environmental prospect

Unit - IV: Wealth distribution
Income and wealth distribution under Islamic system - objective - sources of public revenue in Islam - means of distribution of wealth - Zakah and Waqf institutions and their economic aspects.

Unit - V: Islamic co-operation, institutions and Islamic business ethics
International Islamic cooperation- institutional infrastructure supporting Islamic finance- role of Islamic Development Bank in Economic Cooperation and Development- Islamic ethics for business and transaction.

Text book
1. Study manual of Emirates Institute for Banking and Financial Studies (EIBFS), UAE

Reference Books:
1.Hossein Askari and Abbas Mirakhor,Introduction to Islamic Economics: Theory and Application, Wiley Publication, USA.
2. F.R.Faridi- Aspects of Islamic Economics, New Delhi-2002.
3. Syed Afzal Peer Zade- Economics thoughts in Islam- New Century Publication, New Delhi-2014
4. Dr.S.M. Yousuf- Economic justice in Islam, Kithab Bhavan- New Delhi.

COURSE CODE U8FASB41	SEMESTER-IV	Hrs\Wk: 4
	COURSE TITLE – INVESTMENT MANAGEMENT	CREDIT: 2 EXAM Hrs: 3

Objective:
To impart skills on the fundamentals of the investment and securities.

UNIT- I: Introduction

Definition of investment – objectives – features - classification - distinction between investment and speculation – gambling - growing popularity of investments - factors favouring investment.

UNIT- II: Sources of investment

Sources of investment - annual report of companies – investment companies – types – structure.

UNIT- III: Alternative investment

Bond – types – preference shares – types – equity shares - distinction between equity shares and preference shares – government securities – real estate – money market.

UNIT- IV: Fundamental analysis

Fundamental analysis - Approaches to security analysis - Approaches to technical analysis – differences between security analysis and technical analysis.

UNIT V: Portfolio management

Meaning – process – factors – principles – policies – portfolio investment process – planning stages- risk and return analysis – meaning - causes of risk- classification of risk.

Text book:
1.   Bhalla, V.K- Investment Management, S.Chand & Co, New Delhi- 1999

References:
1. Dr.Natarajan.L, Investment Management- Margham Publications, Chennai-2018.
2. Prasana Chandra- Investment Analysis and Portfolio Management, Tata McGraw Hill,Noida-2009
3. Punithavathy Pandiyan - Security Analysis and Portfolio Management, Vikas Publications-2013.

Objective:

   To gain basic knowledge of important aspects relating to company accounts.

UNIT-I: ISSUE OF SHARES

Issue of Shares - at Par, Premium and Discount– Pro-rata Allotment – Forfeiture and Reissue of Shares- SEBI guidelines relating to issue of Shares

UNIT-II: REDEMPTION OF PREFERENCE SHARES & DEBENTURES

Redemption of Preference Shares – Condition for Redemption- Preparation of Balance Sheet after Redemption

Debentures – Issue of Debentures – Redemption of Debentures

UNIT-III: VALUATION OF GOODWILL & SHARES

Valuation of Goodwill: Need – Factors affecting the Valuation – Methods of valuation of goodwill.

Valuation of Shares: Need – Factors affecting the valuation – Net Asset, Yield and Fair Value Methods.

UNIT-IV: FINAL ACCOUNTS

Final Accounts – Preparation of profit and loss account and balance Sheet as per provisions of Companies Act, 2013 (New Format) - Calculation of managerial remuneration.

UNIT-V: ALTERATION OF SHARE CAPITAL

Alteration of Share Capital - Capital Reduction – Conditions for Capital Reduction – Preparation of Balance Sheet after Reduction

(Weightage of Marks – Problems: 80% & Theory: 20%)

Text Books:

1. Jain &Narang – Advanced Accountancy – Kalyani Publishers, 2018
2. Reddy T.S. & Murthy A. – Corporate Accounting – Margham Publications, Chennai, 2018

Reference Books:

1. Shukla M.C.Grewal, T.S.Gupta – Advanced Accounts – S.Chand& Co. Ltd, New Delhi 2018
2. Gupta R.L. &Radhaswamy. M – Sultan Chand & Sons, New Delhi, 2018

COURSE CODE **U8CA3002**	**SEMESTER-III** **COURSE TITLE – COMMERCIAL LAW**	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objectives: To give an exposure to the students of some of the important laws, for the conduct of modern business organization

UNIT-I: Introduction to Law

Meaning of law – Sources of law – Indian Contract Act 1872 – Classification of Contract on the basis of formation – Classification of Contract on the basis of validity - Classification of Contract on the basis of execution

UNIT-II: Essentials of Contract

Essential Element of Contract – Offer – Rules relating to offer - Acceptance – Legal provisions relating to acceptance – Lawful consideration – Rules related to consideration – Exceptions to consideration - Capacity to Contract – Classification of Incompetency – Minors position in Contract - Free consent – Flaw in free consent

UNIT-III: Discharge of Contract, Contract of Guarantee and Contract of Indemnity

Discharge of Contract - Remedies of breach of contract – Contract of Indemnity – Essentials of Contract of Indemnity – Contract of Guarantee - Essentials of Contract of Guarantee – Differences between contract of Indemnity and contract of Guarantee – Rights of Surety.

UNIT-IV: Contract of Agency, Bailment and Pledge

Contract of Agency – Essentials of agency contract – Kinds of agents – Duties of an agent – Rights of an agent – Duties of a principal – Rights of a principal – Termination of Agency – Bailment – Pledge.

UNIT-V: Sale of Goods Act, 1930.

Sales of Goods Act, 1930 – Definition of sale – Agreement to sell – Difference between sale and agreement sell – Conditions – Warrantees – Difference between conditions and warranties – Types of Goods

Text Book

1.   Commercial and Industrial Law – Dr.M.R Srinivasan. Margham Publications, Chennai, 2018.

Reference Books

1.   Mercantile Law – N.D. Kapoor, S.Chand& Co. Ltd, New Delhi, 2018.
2.   Elements of Commercial Law – N.D. Kapoor. S.Chand& Co. Ltd, New Delhi, 2018.
3.   Mercantile Law – M.C. Shukla. S.Chand& Co. Ltd, New Delhi, 2018.

COURSE CODE	SEMESTER-III	Hrs\Wk: 4
U8CA3003	**COURSE TITLE – STATISTICS I**	CREDIT: 4 EXAM Hrs: 3

Objectives:

  To make the students acquaint with basic concepts and tools of statistics

UNIT-I: INTRODUCTION TO STATISTICS AND INDIAN STATISTICS ORGANISATIONS

Origin, Meaning, Scope and Functions of Statistics – Methods of Primary and Secondary data collection – Classification and Tabulation of data – **Indian Statistics:** NSSO and CSO – Meaning and Objectives - Methods of Collecting NSSO and CSO data **(Theory Only)**

UNIT-II: DIAGRAMMATIC AND GRAPHIC PRESENTATION OF DATA

Meaning, Importance and limitations of Diagrams and Graphs – Presentation of Indian Union Budget Census Data in diagrams – Line Diagrams, Bar Diagram and Pie Diagram – **Simple Graph -** Histogram, Frequency Polygon and Ogive.

UNIT-III: MEASURES OF CENTRAL TENDENCY / AVERAGES

Meaning and Importance – Calculation of Averages using Vital Statistics Data - Arithmetic Mean, Median and Mode – Weighted Arithmetic Mean.

UNIT-IV: MEASURES OF DISPERSION

Meaning, Merits and Limitations – Range, Quartile Deviation, Mean Deviation, Standard Deviation.

UNIT-V: MEASURES OF SKEWNESS

Meaning, Definition and Types – Karl Pearson's Coefficient of Skewness – Bowley's Coefficient of Skewness

(Weightage of Marks – Problems: 80% & Theory: 20%)

TEXT BOOKS

1. R.S.N. Pillai and V.Bhagavathi, Statistic – S.Chand Publication.
2. S.L. Aggarwal & S.L. Bhardwaj, Business Statistics - Kalyani Publishers.

Reference books:

1. S.P. Gupta, Statistical methods - Sultan Chand Publications.
2. P.R. Vittal , Business Statistics- Margham Publication.
3. B.N.Asthana, Elements of statistics – Chaitanya Publishing house Allahabad.
4. Richard Levin & David Rubin, Statistics for Management – Prentice Hall.

Objectives:
To impart functional knowledge of various types of Insurance

UNIT-I: Introduction of Insurance

Meaning of Insurance   -Definition – Functions of Insurance -Classification of Insurance – General principles Insurance contract- Role of Insurance Regulatory and Development Authority (IRDA)

UNIT-II: Life Insurance

Meaning of Life Insurance – Characteristics- Advantages of Life Insurance- Life insurance Vs. Non- Life Insurance – Procedure for effecting Life Insurance – Companies offering life insurance policies

UNIT-III: Marine Insurance

Definition – fundamental principles of marine insurance- Types of marine insurance- Functions of marine insurance – Types of marine Losses – Companies offering marine insurance policies.

UNIT-IV: Fire Insurance

Meaning and Definition – Principles of law as applied to fire insurance – Functions of fire insurance-Feature of fire insurance - Kinds- re-insurance – Renewals – Companies offering fire insurance- Double Insurance.

UNIT-V: General Insurance

Meaning - Types of General Insurance –Critical Illness, Medical Insurance-Vehicle Insurance-Burglary insurance – Livestock & Cattle Insurance   - Crop Insurance –Procedure for Claims

TEXT BOOKS
1.   A. Murthy – Elements of Insurance , Margham Publications, Chennai, 2014
2.   Dr. B. Vardharajan – Insurance Vol. 1 and 2 – Margham Publications, Chennai, 2014

Books for Reference:
1.   R.S. Sharma – Insurance Principles & Practice – GK Books. Bombay, 2006.
2.   Risk Management & Insurance – Harrington, – Tata McGraw Hill publications. 2006

Objective:
 * *To provide knowledge on the fundamental aspects of Management Information System*
 * *To expose how MIS is supporting in management and decision making.*

UNIT-I: Introduction of MIS

Data – Information – Introduction to Management Information System (MIS) – MIS definition – Role of MIS - Features of MIS – Elements of MIS – Approaches to MIS development – Benefits of MIS – Limitations of MIS.

UNIT-II: Subsystems

Management Information Subsystems – Transaction Process System – Decision Support System – Executive Support System – Enterprise Resource Planning – Business Expert System – Office Automation System

UNIT-III: Structure of MIS and Functional MIS

Physical Structure of MIS – Functional Management Information Systems – Financial and Accounting Information System – Production Information Systems – Marketing Information System – Human Resource Information System.

UNIT-IV: Database & DBMS

Database – Features of database – Structure of database – Data Models – Types of Data Models – Hierarchical Model – Network Model – Relational Model – ER Model – DBMS – Features of DBMS – Components of DBMS.

UNIT-V: System Analysis & Implementation

Definition of System Analysis – Need for System Analysis – System Analyst Definition – Roles of System Analyst – System Development Life Cycle – System Implementation – System Implementation Methods – System Implementation Steps.

Text Book:
1. Management Information Systems, P. Rizwan Ahmed, Margham Publications, 2018.

REFERENCE BOOKS:
1. Management Information Systems, Thomas Tharakan, Surabhi Books, 2018.
2. Management Information Systems, Waman S Jawadekar, Tata McGraw Publishing Company Limited, 2018.
3. Management Information Systems, Davis and Olson, Tata McGraw Publishing Company, 2018.
4. Management Information Systems, Laudon & Laudon, Prentice Hall of India Private Limited, 2018.
5. Database System Concepts, Avbraham Silberschatz Henry F.Korth S Sudashan, TMH
6. Database System Concepts, Nirmala Devi.

COURSE CODE U8CAAP31	SEMESTER-III COURSE TITLE – ALLIED- DATABASE MANAGEMENT SYSTEM (Practical SQL and PL/SQL)	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

Objectives:
To gain practical knowledge of Database Architecture, Models and their applications

1. The Structure of the Table is given below. Using that structure, create the ' emp' table and insert 15 values in it (use SQL)

Name	Type	Constraint
EMPNO	NUMBER(4)	PRIMARY KEY
ENAME	VARCHAR2(10)	
JOB	VARCHAR2(9)	
MGR	NUMBER(4)	
HIREDATE	DATE	
SAL	NUMBER(7,2)	
COMM	NUMBER(7,2)	
DEPTNO	NUMBER(2)	FOREIGN KEY REFERENCES "dept"

2. Create the 'dept' table and insert 5 values in it [using the following structure]

Name	Null?	Type
DEPTNO	NOTNULL	NUMBER(2)
DNAME		VARCHAR2(14)
LOC		VARCHAR2(13)

3. From the above [1 & 2], Execute the following Queries using 'emp' and 'dept' tables in SQL
❖ Display all details of the employees
❖ List the entire distinct job in employee
❖ Find all the sales people in department 30 whose salary is greater than or equal to 1500
❖ Find name, job, salary of employees whose job is manager or salary is greater than or equal to 3000
❖ Find the employees earning between 1200 and 1300
❖ List jobs and departments of employees whose name start with M
❖ List the average salary in each dept

❖   List the employees whose salary exceeds their manager

4. Create a table client-master with the following fields: client no, name, address, client state, pin code, remarks, bal due with suitable data types.
❖   Create another table supplier table from client master. Select all the fields a rename client no with supplier no and name with supplier name.
❖   Insert data into client master
❖   Insert data into supplier master from client master.
❖   Delete the selected row in the client master.

5.   Create a table sales order with s-order-no and product no as primary key. Some other fields to store client number, delivery address, delivery date, order status.
▪   Add a new column for storing salesman number using ALTER Command.
▪   Set the s order no as foreign key as column constraints.
▪   Set the s order no as foreign key as table constraints.
▪   Enforce the integrity rules using CHECK.

6.   Create a table student master with the following fields name, reg.no. Dept. with suitable data types. Use Select Command to do the following.
▪   Select the student's name column.
▪   Eliminate the duplicate entry in table.
▪   Sort the table using order by clause.
▪   Select the student using group by clause.

7.   Create a table master book to contain the information of magazine code, magazine name, and publisher. Weekly / biweekly / monthly, price. Write PL / SQL block to perform insert, update, and delete operations on the above table.

8.   Create a table of your own with essential fields and execute the following functions in SQL:
➢   Any 4 group functions
➢   Any 4 numeric functions
➢   Any 4 string functions
➢   Date functions and conversion functions

Books for study:

1.   Alexis lean, Mathews Leon, Essential of DBMS, Vijay Nicole .2014
2.   Singh-Database systems: Concepts, Design & applications, Pearson Education.2010
3.   Jhon Day, Craig Van Slyke "Starting with Oracle.

COURSE CODE	SEMESTER-III	Hrs\Wk: 4
U8CASB31	COURSE TITLE – BUSINESS COMMUNICATION	CREDIT: 3
		EXAM Hrs: 3

Unit- I: Introduction to Business Communication

Business Communication – Introduction – Definition – Characteristics – Channels of Communication- Methods – Types – Principles of effective communication – Barriers to communication

Unit – II: Formal Communication

Listening: Importance of Listening – Process – Types - Reading Skills- Oral Communication (Speaking)

Unit – III: Kinds of Business Letter

Business Letter: Meaning – Types – layout – Letter of Enquires – Quotations – Offer – Orders – Circular Letter – Letter of Application for Job – Curriculum Vitae – Resume – Difference between Curriculum Vitae and Resume.

Unit – IV: Report Writing & Promotion Material

Report writing – Agenda, Minutes of Meeting – Memorandum – Office Order – Circular – Notes – Brochures- pamphlets – handbills - Advertisement copy – Television and print media advertisements

Unit – V: Modern Forms of Communications

Introduction - Fax – e-mail – Etiquittes – Video Conferencing – Internet - Social media- websites – Individual blogs and their uses in Business correspondence

TEXT BOOKS:

1. Essentials of Business Communication – Rajendra Pal & J.S.Korlahalli
2. Communication for business-Shirley Taylor

REFERENCE BOOK:

1. Essentials of Business Communication - Rajendra pal & J.S.Korlahalli
2. Communication for Business - Shirley Taylor
3. Business Communication Today – Bovee, Thill, Schatzman
4. Advanced Business Communication – Penrose, Rasbery, Myers

COURSE CODE	SEMESTER-IV	Hrs\Wk: 5
U8CA4001	**COURSE TITLE – ADVANCED ACCOUNTING II**	CREDIT: 5 EXAM Hrs: 3

Objective:

To gain basic knowledge, of important aspects relating to, Amalgamation, Merger, banking companies & inflation accounting

UNIT-I: ACQUISITION OF BUSINESS

Acquisition of Business –Purchase Consideration-Methods of Purchase Consideration – Taking over of Assets and Liabilities except debtors and creditors- profit prior to incorporation

UNIT-II: AMALGAMATION, ABSORPTION AND EXTERNAL RECONSTRUCTION

Amalgamation, Absorption and External Reconstruction – Method of calculation of purchase consideration

Accounts of Holding Companies – Minority Interest – Cost of Control –Consolidated Balance Sheet.

UNIT-III: LIQUIDATION ACCOUNTING

Liquidation Accounting – Order of payment – Liquidator's Final Statement of Accounts.

UNIT-IV: BANK ACCOUNTS

Bank Accounts: Rebate on Bills Discounted, Interest on Doubtful Debts, Preparation of Profit and Loss Account and Balance Sheet with Relevant Schedules (New format) – Non-Performing Assets (NPA)

UNIT-V: INFLATION ACCOUNTING

Inflation Accounting (Accounting for price level changes) – Limitations of Historical Accounting – Current Purchasing Power Method – Current Cost Accounting Method – Hybrid Method – Preparation of Income statement – Profit and Loss Account and Balance sheet.

(Weightage of Marks, Problems: 80% and Theory: 20%)

Text Books:

1. Jain & Narang – Advanced Accountancy – Kalyani Publishers 2018

2. Reddy T.S. & Murthy A. – Corporate Accounting – Margham Publications, Chennai, 2018

Reference Books:

1. Shukla M.C.Grewal, T.S.Gupta – Advanced Accounts – S.Chand& Co. Ltd, New Delhi 2018
2. Gupta R.L. &Radhaswamy. M – Sultan Chand & Sons, New Delhi, 2018

COURSE CODE U8CA4002	SEMESTER-IV COURSE TITLE – COMPANY LAW	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3

Objective: To enable the students gain basic knowledge in Corporate Law with reference to Companies Act, 2013.

Unit-I: Introduction
History of Company Law In India – Companies Act, 2013 – Authorities Under Companies Act, 2013 – Meaning And Definition of A Joint Stock Company – Features – Kinds of Companies – Differences Between Private And Public Companies – One Person Company – LLP.

Unit-II: Formation of Company.
Formation of A Company – Promotion – Incorporation – Commencement of Business – Memorandum of Association And Its Contents – Articles of Association and Its Contents.

Unit-III: Prospectus & Securities.
Prospectus – Contents of Prospectus – Statement In Lieu of Prospectus – Consequences of Misstatements in Prospectus – Definition of Shares – Kinds of Shares – Definition of Debentures – Types of Debentures.

Unit-IV: Directors
Board of Directors – Directors – Number of Directors – Appointment of Directors – Powers of Directors – Duties of Directors – Director's Liability – Disqualification of A Director – Director Identification Number – Independent Directors – Managing Director – Whole Time Director.

Unit-V: Meetings & Winding Up
Company Meetings – Kinds of Meetings – Resolution – Types of Resolution - Winding Up of A Company – Types of Winding Up – Consequences of Winding Up.

Text Book:

1. Company Law, J. Santhi, Margham Publication, Chennai, 2018.

Reference Book:

1. Company Law, Dr. Srinivasan, Margham Publication, Chennai, 2018.
2. Company Law, N.D Kapoor, Sultan Chand Sons, New Delhi, 2018.
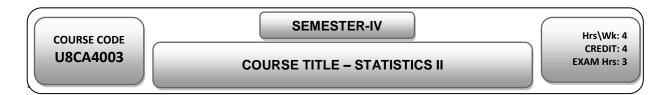3. Company Law, S.S Raghu, Kalyani Publishers. New Delhi, 2018.

COURSE CODE **U8CA4003**	**SEMESTER-IV** **COURSE TITLE – STATISTICS II**	**Hrs\Wk: 4** **CREDIT: 4** **EXAM Hrs: 3**

Objective:

To make students acquire basic knowledge of correlation analysis, regression analysis, time series analysis, index numbers and statistical quality control.

UNIT-I: COMPUTER APPLICATIONS IN STATISTICS
Introduction to Statistical Analysis Software – SPSS, Stata, MATLAB, R. – Meaning, Features and Uses **(Theory Only)**

UNIT-II: CORRELATION ANALYSIS
Meaning, Types, Merits and Limitations of correlation – Methods of studying correlation – Scatter Diagram – Karl Pearson's Coefficient of Correlation – Spearman's Rank correlation.

UNIT-III: REGRESSION ANALYSIS
Meaning, Importance, Limitations – Differences between Correlation and Regression – Regression Equations – Deviation taken from Arithmetic mean and assumed mean

UNIT-IV: TIME SERIES ANALYSIS
Meaning, Need and Components of Time series – Different methods of measuring trend – Free hand method, Semi-average method, Moving average method and Method of Least squares – Seasonal Indices by Simple Average Method.

UNIT-V: INDEX NUMBERS
Meaning, Uses and Methods of construction Index Numbers – Types - Unweighted and Weighted Index Numbers-Laspeyre's, Paasche's, Bowley's, Fisher's and Marshall Edge-worth Methods - Time Reversal and Factor Reversal Tests.
(Weightage of Marks – Problems: 80% & Theory: 20%)

TEXT BOOKS
1. R.S.N. Pillai and V.Bhagavathi, Statistic – S.Chand Publication.
2. S.L. Aggarwal & S.L. Bhardwaj, Business Statistics - Kalyani Publishers.

Reference books:
1. S.P. Gupta, Statistical Methods - Sultan Chand Publications.
2. P.R. Vittal, Business Statistics - Margham Publications.

3. B.N.Asthana, Elements of statistics – Chaitanya Publishing house Allahabad.
4. Richard Levin & David Rubin, Statistics for Management – Prentice Hall.

COURSE CODE U8CANM41	SEMESTER-IV COURSE TITLE – CONSUMER WELFARE	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

Objective:
To make students acquire basic knowledge of consumer laws, consumer rights and consumer welfare.

Unit- I: INTRODUCTION TO CONSUMER WELFARE
Consumer: Meaning-Legal Definition of Consumer- Classification of Consumers- Consumer Needs- Factors affecting Consumer needs- Consumer Welfare -Measures taken by Central & State Government towards consumer welfare.

Unit- II: CONSUMER AWARENESS
Consumer Awareness: Meaning- Need – Benefits of Consumer awareness-Consumer Protection Act 2002 (Amendment) – Definition – Need –Significance-Objectives of Consumer Protection Act – Forums of Consumer Protection.

Unit –III: CONSUMER DISPUTE REDRESSAL AGENCIES
Consumer Dispute Redressal Agencies: Goods and Services cover under Consumer Protection Act- Procedure for failing of complaints with National Commission –State Commission – District Forum- Consumer Protection Councils- Central and State.

Unit- IV: CONSUMER RIGHTS
Consumer welfare and Right to Information Act, 2005: Right to Information under the Act- Information exempted from disclosure – Maintenance and Computerization record – Creation of RTI cell.

Unit – V: CONSUMER WELFARE MEASURES
Consumer Welfare Measures taken by MNC's- Recent trends in consumer activism- Role of Supreme Court and High Courts in Consumer Welfare- Role of NGO's in Consumer Education - Case Laws

TEXT BOOKS:
1. Consumer Awareness, Dr. R. Sivanesan, Margham Publications

REFERENCE BOOKS

1. Consumer Protection (Amendment) Act, 2002. S.Chand & Sons.2012
2. Consumer Behaviour, Rajan Nair, Sultan Chand & Sons.2010

COURSE CODE U8CAAL41	SEMESTER-IV	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – ALLIED-ENTERPRISE RESOURCE PLANNING	

Objective: To make aware basics of Enterprise Resource Planning

UNIT – I: Introduction to Enterprise Resource Planning
History of ERP – Need for ERP – Definition of ERP – Features of ERP – Components of ERP – Emergence of ERP – Needs for ERP-Benefits of ERP – Functions of ERP.

UNIT – II: ERP Implementation
ERP Implementation – Challenges to successful ERP Implementation – Phases of ERP implementation – Reasons of ERP implementation failure – ERP implementation strategies – Composition of implementation team.

UNIT – III: Functional Modules
Functional modules of ERP software – Financial Module – Manufacturing Module – Plant maintenance Module- Material management Module– HR Module – Quality Management Module – Marketing Module – Sales and distribution Module – Plant Maintence – Material Management.

UNIT – IV: ERP Techniques
ERP and its related technologies- Business process Reengineering (BPR) - Data warehousing - Data mining – Online analytical processing (OLAP) – Product life cycle management (PLM).

UNIT – V: Popular ERP Packages
Definition of Supply Chain Management (SCM) – Features of SCM – Customer Relationship Management (CRM) – Features of CRM – Popular ERP Software – SAP – Oracle – PeopleSoft – R. Systems – Tally ERP – Peachtree – ERP in Leather Industry –ERP Resources on the internet.

TEXT BOOKS
1. Enterprise Resource Planning – By Dr.P Rizwan Ahmed- Margham Publications 2018
2. Enterprise Resource Planning – By S.Sadagopan - Margham Publications 2018

REFERENCE BOOKS
1. Enterprise Resource Planning – By Leon Alexis- Tata McGraw-Hill 2016

2. Enterprise Resource Planning – By Mary Sumner- Pearson Education 2015.
3. Enterprise Resource Planning – By Ashim Raj Singla-Cengage Learning India(P)Ltd

	SEMESTER-IV	
COURSE CODE **U8CAAP41**	**COURSE TITLE – ALLIED PRACTICAL - VISUAL BASIC PROGRAMMING**	**Hrs\Wk: 4** **CREDIT: 3** **EXAM Hrs: 3**

Objective:
To make students acquire practical knowledge of using visual basic programming to developing business applications

1. Design a form with text book to perform the alignment and format function

2. Design a form to display the list of product by declaring array function

3. Design an application for student mark list

4. Design a form to calculate capital budgeting technique by declearing finance function and valuable decleration using option button (Radio/Check box)

5. Design a formto display an advertisement banner using image box control with string function

6. Design a form to compute cost of capital using finance function in visual basic using cheak box

7. Design a form to perform working capital analysis by declearing finance function using flex grid conrol

8. Design a form to display Break-even analysis using line and chart controls, by delearing variables

9. Design a supermarket bill to display the sales invoice, and create a database using Data control, option button, check box, data picker, etc.,

10. Design a form to calculate minimum, maximum, recorder, recorder quality, EOQ and display the inventory control records using data object.

Text Book
   1. Dr. A Murugan, Visual Basic Programming, Margham Publications 2018

Refference Books

1. Mohammed Azam, Programming with Visual Basic 6.0- Vikas Publishing House
2. Content Development group, Visual Basic 6.0-Tata McGraw Hill
3. Net-Web source

COURSE CODE U8CASB41	SEMESTER-IV COURSE TITLE – PRINCIPLES OF MARKETING	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3

Objective:
To enable the students gain basic knowledge of Marketing.

UNIT – I: Introduction of Marketing

Introduction of Marketing – Meaning, Definition, Nature and Scope – objectives-Significance-Evolution of Marketing concepts– Functions of Marketing – Marketing environment- Marketing Mix.

UNIT – II: Product Planning, Development and Segmentation

Product Planning & Development: Concept and New Product-Development - Product Classification- Product Mix Decisions – **Packing:** Meaning, Objectives, Features – **Labeling:** Meaning, Objectives, Features- **Branding:** Meaning, Objectives, Features - Product Life Cycle- **Market Segmentation:** Meaning, Objectives and Bases.

UNIT – III: Pricing

Pricing decisions and strategies: Concept –Types of Pricing- Factors affecting pricing determination and Pricing Mix Decisions, Strategies related to Pricing, Marketing strategies of Leather Industries and other Local Business.

UNIT – IV: Promotion

Promotion: Nature and Significance of Promotion- Promotion Tools- Advertising, Personal Selling, Public relations and sales promotion- Promotion Mix - Factors affecting promotion mix decisions

UNIT – V: Recent Development in Marketing

Recent Developments in Marketing: Social Marketing – Online marketing, Direct marketing, Service Marketing – Green Marketing – Uses of Social Media in Marketing.

TEXT BOOKS

1. Marketing by Rajan Nair, Sultan Chand & Sons.2010
2. Modern Marketing by R.S.N. Pillai, S. Chand Ltd., New Delhi.2014
3. Marketing Management in Indian Perspective by Jha and Singh, Himalaya.2013

BOOKS FOR REFERENCE

1. Fundamentals of Marketing by William J. Stanton, MC Graw – Hill.2011
2. Principles of Marketing by Philip Kotler, Prentice Hall. 2010
3. Marketing Management – Radhasamy & Namakumari, Millennium Publication.

COURSE CODE **U8MS3001**	**SEMESTER-III** **COURSE TITLE – DIFFERENTIAL EQUATIONS**	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

Objectives:This course aims to provide logical skills in the formation of differential equations, to expose to different techniques of finding solutions to these equations and in addition stress is laid on the applications of these equations in geometrical and physical problems.

UNIT– I   ORDINARY LINEAR DIFFERENTIAL EQUATIONS   15 Hours

Bernoulli's Equations – Exact differential equations – Equations reducible to Exact equation -Equations of the first order and higher degree – Equations solvable for *p,* Equations solvable *x*, Equations solvable for *y* – Clairaut's equation.

Chapter 11 : Sections 11.10, 11.11, 11.12, 11.13, 11.14.

UNIT– II   ORDINARY LINEAR DIFFERENTIAL EQUATIONS   15 Hours

(Contd .)

Definitions – Operator D – Rules for finding the complementary function – Inverse Operator – Rules for finding the particular integral – Working procedure to solve the equation – Method of Variation of Parameters.

Chapter 13: Sections 13.1, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8 (I).

UNIT– III   ORDINARY LINEAR DIFFERENTIAL EQUATIONS   15 Hours

(Contd .)

Equations reducible to linear equation with constant coefficients : Cauchy's homogeneous linear equations – Legendre's linear equations – Linear dependence of solutions –

Simultaneous equations with constants coefficients – Equation of the form $\dfrac{d^2 y}{dx^2} = f(x)$ –

Equation of the form $\dfrac{d^2 y}{dx^2} = f(y)$ – Equations which do not contain y – Equations which do not contain x – Equations whose one solution is known.

Chapter 13 : Sections 13.9, 13.10, 13.11

Chapter 15 : Sections 15.2, 15.3, 15.4, 15.5, 15.6.

UNIT– IV   PARTIAL DIFFERENTIAL EQUATIONS   15 Hours

Formation of a PDE – Solutions of a PDE – Equations solvable by Direct integration – Equation of the form $\dfrac{dx}{P} = \dfrac{dy}{Q} = \dfrac{dz}{R}$ – Linear equations of the first order – Non-linear equations of the first order.

Chapter 17 : Sections 17.2, 17.3, 17.4

Chapter 15 : Section 15.10

Chapter 17 : Sections 17.5, 17.6

UNIT– V   PARTIAL DIFFERENTIAL EQUATIONS (Contd.)   15 Hours

Homogeneous linear equations with constant coefficients – Rules for finding the complementary function – Rules for finding the particular integral – Working procedure to solve the equation.

Chapter 17: Sections 17.8, 17.9, 17.10, 17.11, 17.12.

CONTENT AND TREATMENT AS IN:
    Dr. B.S. Grewal (2008), HIGHER ENGINEERING MATHEMATICS, Khanna Publishers, New Delhi.

REFERENCES

1. *M.D. RaiSinghania* (2001), ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS, S. Chand & Co., New Delhi.
2. *M.R. Spiegel* (2005), ADVANCED MATHEMATICS FOR ENGINEERS AND SCIENTISTS, Tata Mc Graw Hill Edition, New Delhi.
3. *Sheply L. Ross* (1984), DIFFERENTIAL EQUATIONS, III Edition, John Wiley & Son, New York.

4. *M.L. Khanna* (2004), DIFFERENTIAL EQUATIONS, Jaiprakashnath and Co.
5. *Dr. M. K. Venkataraman* (1998), ENGINEERING MATHEMATICS, Volume III B, 13th Edition, National Publishing Company.

COURSE CODE **U8MS3002**	**SEMESTER-III** **COURSE TITLE – VECTOR ANALYSIS AND FOURIER SERIES**	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

Objectives: This course covers the topics in vector analysis and Fourier series which are essential tools of modern applied mathematics. To develop deep understanding of key concepts followed by problems of applied nature.

UNIT– I   VECTOR CALCULUS, GRADIENT, DIVERGENT AND   12 Hours
CURL

Vector differentiation – The vector differential operator – Gradient – Direction and magnitude of gradient – Divergence and Curl – Formula involving ∇ operator – Operators involving ∇ twice.

Text Book 1 : Chapter 4 : Sections 6 to 12.

UNIT– II   VECTOR INTEGRATION   12 Hours

Line integral – Surface integral – Volume integral – Problems.

Text Book 1 : Chapter 6 : Sections 2 to 5.

UNIT– III   APPLICATIONS   12 Hours

Gauss Divergence Theorem – Stoke's Theorem – Green's Theorem (Without Proof) – Simple verification of Theorems and problems.

Text Book 1 : Chapter 6 : Sections 6 to 10.

UNIT– IV   FOURIER SERIES   12 Hours

Euler's Formulae – Conditions for a Fourier expansion – Functions having points of discontinuity – Change of interval – Even and odd functions.

Text Book 2 : Chapter 10 : Sections 10.2, 10.3, 10.4, 10.5, 10.6.

UNIT– V   HALF RANGE SERIES AND HARMONIC ANALYSIS   12 Hours

Half Range Series – Parseval's Formula – Root mean square value – Practical Harmonic analysis.

Text Book 2 : Chapter 10 : Sections 10.7, 10.9, 10.11.

CONTENT AND TREATMENT AS IN:

1. *S. Narayanan and T.K. Manicavachagam Pillai* (1995), VECTOR ALGEBRA AND ANALYSIS, S. Viswanathan Publishers Pvt. Ltd.
2. *Dr. B.S. Grewal* (2008), HIGHER ENGINEERING MATHEMATICS, Khanna Publishers, New Delhi.

REFERENCES

1. *G.B. Thomas and R.L. Finney* (1998), CALCULUS AND ANALYTIC GEOMETRY, Addison Wesley, 9th Edition, Mass, Indian Print.
2. *M.K. Venkataraman* (1992), ENGINEERING MATHEMATICS, Part B, National Publishing Company, Chennai.
3. *P.R. Vittal* (2004), VECTOR CALCULUS, FOURIER SERIES AND FOURIER TRANSFORM, Margham Publications, Chennai.
4. *M.L. Khanna* (1986), VECTOR CALCULUS, Eighth Edition, Jai Prakash Nath and Co.

COURSE CODE **U8MSAL31**	**SEMESTER-III** **COURSE TITLE – ALLIED - MATHEMATICAL STATISTICS I**	Hrs\Wk: 7 CREDIT: 6 EXAM Hrs: 3

Objectives: To apply statistics methods for mathematical problems.

UNIT– I   PROBABILITY   21 Hours

Mathematical probability- Empirical probability- Axiomatic approach to probability- some theorems on probability-Conditional probability-multiplication on probability-Independent events –Bayes theorem.

Chapter 3: 3.4, 3.5, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13

Chapter 4: 4.2

UNIT– II   RANDOM VARIABLE AND DISTRIBUTION FUNCTIONS 21 Hours

Distribution function-Discrete random variable –continuous random variable-two dimensional random variable.

Chapter 5: 5.2, 5.3, 5.4, 5.5.1, 5.5.2, 5.5.3, 5.5.4, 5.5.5

UNIT– III   MATHEMATICAL EXPECTATIO   21 Hours

Mathematical expectation – Expected value of a function of a random variable – Properties of expectations-properties of variance – Covariance – Karl Pearson's coefficient of correlation-Rank correlation –Linear Regression.

Chapter 6: 6.2, 6.3, 6.4, 6.5, 6.6

Chapter 10: 10.4, 10.7

Chapter 11: 11.2

UNIT– IV   GENERATING FUNCTIONS   21 Hours

Moment generating function – Cumulants – Characteristic function-inversion theorem(statement only) – Uniquenes theorem of characteristic function(statement only)- Chebychev's inequality.

Chapter 7: 7.1, 7.2, 7.3, 7.4, 8.4.6, 8.4.7

UNIT– V   PROBABILITY DISTRIBUTIONS   21 Hours

Discrete distributions: Uniform distribution, Binomial distribution, Poisson distribution.

Continuous distributions: Normal distribution, Gamma distribution, Beta distribution, Exponential distribution.

Chapter 8: 8.2, 8.4, 8.4.1, 8.4.2, 8.4.8, 8.4.9, 8.5, 8.5.2, 8.5.5, 8.5.6.

Chapter 9: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.3.1, 9.3.2, 9.3.3, 9.5.1, 9.5.2, 9.6, 9.8

CONTENT AND TREATMENT AS IN:
S. C. Gupta and V. K. Kapoor (2017), Fundamentals of Mathematical Statistics, Eleventh thoroughly revised edition, Sultan Chand & sons, New Delhi.

REFERENCES:
1. *R.V. Hogg and A.T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS, Macmillan.
2. *A.M. Mood, G.A. Graybil and D.G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
3. *S.S. Wilks,* ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.

COURSE CODE U8MSAP31	SEMESTER-III COURSE TITLE – ALLIED - MATHEMATICAL STATISTICS PRACTICAL I	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

1. Measure of Central Tendency.
2. Measure of Dispersion.
3. Correlation Coefficient, Bivariate Correlation Coefficient, Rank Correlation Coefficient and Coefficient of Concurrent deviation.
4. Regression Equations.

5. Curve Fitting by the Method of Least Squares
   a) $y = a x + b$.
   b) $y = a x^2 + b x + c$.
   c) $y = ae^{bx}$.
   d) $y = a x^b$.

NOTE:

Use of Scientific Calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

CONTENT AND TREATMENT AS IN:

S. P. Gupta, STATISTICAL METHODS, Sultan Chand & Sons, New Delhi.

REFERENCES:

1. *R.V. Hogg and A.T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS,Macmillan.
2. *A. M. Mood, G. A. Graybil and, D.G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
3. *S. S. Wilks,* ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.
4. *S.C. Gupta and V.K.Kapoor,* FUNDAMENTAL OF APPLIED STATISTICS,Sultan & sons.

COURSE CODE **U8MS4001**	**SEMESTER-IV** **COURSE TITLE – SPECIAL TRANSFORMS I**	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

Objectives:To introduce the concepts of Laplace transforms and use them to solve differential equations.

UNIT– I   LAPLACE TRANSFORMS   15 Hours

Definition − Conditions for existence − Transforms of elementary functions − Properties of Laplace transforms − Simple Problems.

Chapter 21 : Sections 21.2, 21.3, 21.4

UNIT– II   LAPLACE TRANSFORMS (CONTD…)   15 Hours

Transforms of Periodic functions – Transforms of Derivatives – Transforms of Integrals – Multiplication by t^n – Division by t – Evaluation of integrals by Laplace Transforms – Simple problems.

Chapter 21 : Sections 21.5, 21.7, 21.8, 21.9, 21.10, 21.11

UNIT– III   INVERSE LAPLACE TRANSFORMS   15 Hours

Inverse Laplace Transforms – Method of Partial Fractions.

Chapter 21 : Section 21.12

UNIT– IV   INVERSE LAPLACE TRANSFORMS (CONTD…)   15 Hours

Other Methods of finding Inverse Transforms – Convolution Theorem.

Chapter 21 : Sections 21.13, 21.14

UNIT– V   APPLICATIONS   15 Hours

Application to Differential Equations – Simultaneous Linear equations with constant coefficients.

Chapter 21 : Sections 21.15, 21.16

CONTENT AND TREATMENT AS IN:
> *Dr. B.S. Grewal* (2008), HIGHER ENGINEERING MATHEMATICS, Khanna Publishers, New Delhi.

REFERENCES
1. *Goyal Gupta*, (1994), Laplace and Fourier Transforms, Meerut, Pragati Prakashan Publication.
2. *G. Balaji*, Engineering Mathematics – II, Balaji Publishers, Chennai.

COURSE CODE
U8MS4002

Hrs\Wk: 4
CREDIT: 3
EXAM Hrs: 3

380.

381.

Objectives: To introduce the concepts of Fourier transforms and Z – transforms.

UNIT– I   FOURIER TRANSFORMS   12 Hours

Definitions – Fourier Integral Theorem – Fourier Transform – Properties of Fourier Transforms.

Chapter 22 : Sections 22.2, 22.3, 22.4 (1), 22.5

UNIT– II   FOURIER TRANSFORMS (CONTD…)   12 Hours

Fourier Cosine transforms – Fourier Sine transforms – Properties.

Chapter 22 : Sections 22.4 (2), 22.5

UNIT– III   12 Hours

Convolution theorem – Parseval's Identity for Fourier transform.

Chapter 22 : Sections 22.6, 22.7

UNIT– IV   Z- TRANSFORMS   12 Hours

Definition – Some standard Z – transforms – Linearity property – Damping rule – Some standard results – Shifting U_n to right and to left – Multiplication by n – Two basic theorems.

Chapter 23 : Sections 23.2, 23.3, 23.4, 23.5, 23.6, 23.7, 23.8, 23.9

UNIT– V   INVERSE Z – TRANSFORMS AND ITS   12 Hours
**   APPLICATIONS**

Some Useful Inverse Z – transform – Convolution Theorem – Evaluation of Inverse Z – Transforms – Application to Difference Equations.
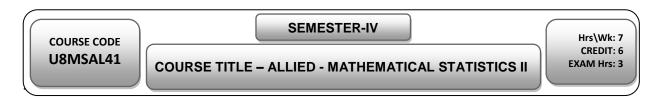
Chapter 23 : Sections 23.11,   23.12,   23.15, 23.16

CONTENT AND TREATMENT AS IN:
    Dr. B.S. Grewal, (2008), Higher Engineering Mathematics, 40th Edition.

REFERENCES

1. *Goyal Gupta*, Laplace and Fourier Transforms, Pragati Edition.
2. *G. Balaji*, Transform and Partial Differential Equations, Balaji Publishers, Chennai.

COURSE CODE	SEMESTER-IV	Hrs\Wk: 7
U8MSAL41	**COURSE TITLE – ALLIED - MATHEMATICAL STATISTICS II**	CREDIT: 6 EXAM Hrs: 3

Objectives: To apply statistical methods for mathematical problems.

UNIT– I   **Large sample Theory**   **21 Hours**

Types of sampling- Parameter and Statistic-Test of significance-Procedure for testing of hypothesis-Test of significance for large samples -sampling of attributes-sampling of variables.

Chapter 14: 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8

UNIT– II   **Exact Sampling distributions**   **21 Hours**

Application of χ^2 - distribution – Goodness of fit test- Test of independent of Attributes – Yate's correction.

Chapter 15: 15.6.2,   15.6.3,   15.6.4.

UNIT– III   **Exact sampling distribution**   **21 Hours**

Application of t- Distribution – t - test for single mean , t - test for difference of means, Paired t-test for difference of means, t-test for correlation coefficient – Applications of F distribution: F-test for equality of two population variances

Chapter 16: 16.3, 16.3.1,16.3.2,16.3.3,16.3.4, 16.6.1

UNIT– IV   **Theory of Estimation**   **21 Hours**

Characteristics of estimators, Unbiasedness, Consistency, Efficient Estimators, Most Efficient Estimator ,Minimum Variance Unbiased Estimators, Sufficiency – Cramer Rao Inequality Statistical Hypothesis, Steps in solving testing of Hypothesis problem, Optimum test under different situations, Neyman and Pearson Lemma, Likelihood Ratio test

Chapter 17: 17.2.1, 17.2.2, 17.2.3, 17.2.4, 17.3

Chapter 18: 18.2,18.3,18.4,18.5,18.6

UNIT– V   **Analysis of Variance**   **21 Hours**

Analysis of Variance, One way and two way classification, Basic principle of Design of

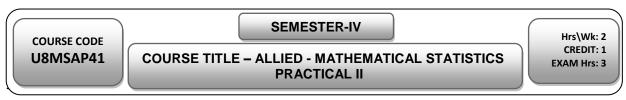Experiments, Randomized Block Design and Latin Square design.

Chapter 5 and Chapter 6 in Statistical Methods , S.P. Gupta

CONTENT AND TREATMENT AS IN:
1. *S.C. Gupta and V.K. Kapoor (2017),* Fundamentals of Mathematical Statistics, Eleventh thoroughly revised edition, Sultan Chand & sons, New Delhi.
2. *S. P. Gupta,* STATISTICAL METHODS, Sultan Chand & Sons, New Delhi.

REFERENCES:
1. *R. V. Hogg and A. T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS, Macmillan.
2. *A. M. Mood, G. A. Graybil and D. G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
3. *S. S. Wilks,* ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.
4. *S.C. Gupta and V.K.Kapoor,* FUNDAMENTAL OF APPLIED STATISTICS, Sultan & sons.

COURSE CODE U8MSAP41	SEMESTER-IV COURSE TITLE – ALLIED - MATHEMATICAL STATISTICS PRACTICAL II	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

1. Large sample tests with regard to population mean, proportion, standard deviation
2. Exact test with respect to Mean, Variance and Coefficient of correlation
3. Test for independence of Attributes Based on χ^2 - Distribution
4. Confidence interval based on Normal, t, χ^2 - and F distributions
5. ANOVA : One way and Two way classifications, RBD, LSD

NOTE:
Use of Scientific Calculator shall be permitted for practical examination. Statistical and   Mathematical tables are to be provided to the students at the examination hall.

CONTENT AND TREATMENT AS IN:
S. P. Gupta, STATISTICAL METHODS, Sultan Chand & Sons, New Delhi.

REFERENCES:

1. *R.V. Hogg and A.T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS, Macmillan.
2. *A. M. Mood, G. A. Graybil and, D.G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
3. *S. S. Wilks,* ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.
4. *S.C. Gupta and V.K. Kapoor,* FUNDAMENTAL OF APPLIED STATISTICS, Sultan & sons.

COURSE CODE P8MS3001	**SEMESTER-III** **COURSE TITLE – COMPLEX ANALYSIS I**	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objectives: To study Cauchy integral formula, local properties of analytic functions, general form of Cauchy's theorem and evaluation of definite integral and harmonic functions.

UNIT–I   CAUCHY'S INTEGRAL FORMULA   18 hours

The Index of a point with respect to a closed curve – The Integral formula – Higher derivatives.
LOCAL PROPERTIES OF ANALYTIC FUNCTIONS: The Maximum Principle.
Chapter 4 : Section 2: 2.1 to 2.3; Section 3: 3.4

UNIT–II   THE GENERAL FORM OF CAUCHY'S THEOREM   18 hours

Chains and Cycles – Simple Connectivity – Homology – The General Statement of Cauchy's Theorem – Proof of Cauchy's Theorem – Locally Exact Differentials – Multiply Connected Regions.
THE CALCULUS OF RESIDUES: Residue Theorem – The Argument Principle.
Chapter 4: Section 4: 4.1 to 4.7; Section 5 : 5.1 to 5.2

UNIT–III   THE CALCULUS OF RESIDUES   18 hours

Evaluation of Definite Integrals. HARMONIC FUNCTIONS: Definition of Harmonic Function and Basic Properties– Mean Value Property – Poisson Formula.
Chapter 4 : Section 5 : 5.3 ; Chapter 4 : Section 6 : 6.1 to 6.3

UNIT–IV   HARMONIC FUNCTIONS AND POWER SERIES   18 hours
**   EXPANSIONS**

Schwarz's Theorem – The Reflection Principle –Weierstrass's Theorem – Taylor's Series – Laurent's Series.
Chapter 4: Sections 6: 6.4 and 6.5; Chapter 5 : Sections 1: 1.1 to 1.3

UNIT–V   PARTIAL FRACTIONS AND ENTIRE FUNCTIONS   18 hours

Partial fractions – Infinite products – Canonical products – Gamma function.
ENTIRE FUNCTIONS: Jensen's formula –Hadamard's theorem.
Chapter 5: Sections 2: 2.1 to 2.4; Chapter 5 : Sections 3: 3.1 and 3.2
CONTENT AND TREATMENT AS IN:
Lars V. Ahlfors, (2012), COMPLEX ANALYSIS, (Third Edition), McGraw Hill Co, New York.

REFERENCES:
1. *H.A. Presfly,* (1990), INTRODUCTION TO COMPLEX ANALYSIS, Clarendon Press, Oxford.

2. *J.B.Conway,* (1978), FUNCTIONS OF ONE COMPLEX VARIABLES, Springer – Verlag, International Student Edition, Narosa Publishing Co.
3. *E. Hille,* (1959), ANALYTIC FUNCTION THEORY, (vol II), Gonm & Co.
4. *S. Ponnusamy, (2000), FOUNDATIONS OF COMPLEX ANALYSIS,* Narosa Publishing House.

COURSE CODE P8MS3002	SEMESTER-III COURSE TITLE – TOPOLOGY	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objectives: To study topological spaces, continuous functions, connectedness, compactness, countability and separation axioms.

UNIT–I TOPOLOGICAL SPACES   18 hours

Topological spaces – Basis of a topology – The order topology – The product topology on X ×Y – The Subspace topology –Closed sets and limit points.
Chapter 2: section 12 to 17.

UNIT–II CONTINUOUS FUNCTIONS   18 hours

Continuous functions –The product topology –The metric topology.
Chapter 2: sections 18 to 21.

UNIT–III CONNECTEDNESS   18 hours

Connected spaces –Connected subspaces of the real line- Components and Local connectedness.
Chapter 3: section 23 to 25.

UNIT–IV COMPACTNESS   18 hours

Compact spaces – Compact subspaces of the real line- limit point compactness- Local compactness.
Chapter 3: sections 26 to 29.

UNIT–V COUNTABILITY AND SEPARATION AXIOMS   18 hours

The countability Axioms – The separation axioms – Normal spaces – The Urysohn lemma – The Urysohnmetrization theorem – The Tietz extension theorem.
Chapter 4: sections 30 to 35.

CONTENT AND TREATMENT AS IN:
James R. Munkres, (2002), TOPOLOGY, (Second Edition), Pearson Education, New Delhi.

REFERENCES:
1. *J. Dugundji*, (1975), TOPOLOGY, Prentice Hall of India , New Delhi.
2. *George F. Simmons,* (1963), INTRODUCTIONS TO TOPOLOGY AND MODERN ANALYSIS, McGraw Hill.
3. *J.L. Kelly,* GENERAL TOPOLOGY, Van Nostrand, Reinhold Co, New York.
4. *L.Sten and J. Subash, Holt, Rinehart and Winston*, COUNTER EXAMPLES IN TOPOLOGY.

5. *S. Willard,* (1970), GENERAL TOPOLOGY, Addison Wesley Mass.

Objectives: To introduce axiomatic approach to probability theory, to study some statistical characteristics, discrete and continuous distribution functions and their properties, characteristic function and basic limit theorems of probability.

UNIT–I   RANDOM EVENTS AND RANDOM VARIABLES   18 hours

Random events − Probability axioms − Combinatorial formulae − Conditional probability − Bayes Theorem − Independent events − Random Variables − Distribution Function − Joint Distribution − Marginal Distribution − Conditional Distribution − Independent random variables − Functions of random variables.
Chapter 1: Sections 1.1 to 1.7
Chapter 2: Sections 2.1 to 2.9

UNIT–II   PARAMETERS OF THE DISTRIBUTION   18 hours

Expectation − Moments − The Chebyshev's Inequality − Absolute moments − Order parameters − Moments of random vectors − Regression of the first and second types.
Chapter 3: Sections 3.1 to 3.8

UNIT–III   CHARACTERISTIC FUNCTIONS   18 hours

Properties of characteristic functions − Characteristic functions and moments − Semi invariants −Characteristic function of the sum of the independent random variables − Determination of distribution function by the Characteristic function − Characteristic function of multidimensional random vectors − Probability generating functions.
Chapter 4: Sections 4.1 to 4.7

UNIT–IV   SOME PROBABILITY DISTRIBUTIONS   18 hours

One point, two points, Discrete Distributions: Binomial − Polya − Hyper geometric − Poisson distributions −Continuous Distributions: Uniform − Normal − Gamma − Beta − Cauchy and Laplace distributions.
Chapter 5: Section 5.1 to 5.10

UNIT–V   LIMIT THEOREMS   18 hours

Stochastic convergence − Bernoulli law of large numbers − Convergence of sequence of distribution functions − Levy-Cramer Theorems −deMoivre Laplace theorem − Poisson, Chebyshev, Khintchine Weak law of large numbers − Lindberg Theorem − Lyapunov theorem.
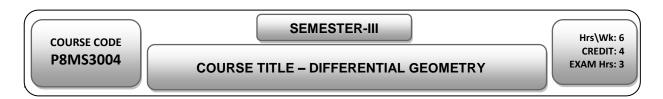*Chapter 6: Sections 6.1 to 6.4, 6.6 to 6.9*

CONTENT AND TREATMENT AS IN:

M. Fisz, (1963), PROBABILITY THEORY AND MATHEMATICAL STATISTICS, John Wiley and sons, New York.

REFERENCES:
1. *R.B. Ash,* (1972), REAL ANALYSIS AND PROBABILITY, Academic Press, New York.
2. *K.L. Chung,* (1974), A COURSE IN PROBABILITY, Academic press, NewYork.
3. *R. Durrett,*(1996), PROBABILITY THEORY AND EXAMPLES, (Second edition), Duxbury press, New York.
4. *V. K. Rohatgi,* (1988), AN INTRODUCTION TO PROBABILITY THEORY AND MATHEMATICAL STATISTICS, Wiley Eastern, New Delhi.
5. *S.I.Resnick,* (1999), A PROBABILITY PATH, Birhauser, Berlin.
6. *B.R.Bhat,* (1999), MODERN PROBABILITY THEORY, (Third edition), New Age International, New Delhi.

COURSE CODE **P8MS3004**	**SEMESTER-III** **COURSE TITLE – DIFFERENTIAL GEOMETRY**	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives: This course introduces space curves and their intrinsic properties of a surface and geodesics. The non–intrinsic properties of a surface and the differential geometry of surfaces are explored.

UNIT–I   SPACE CURVES   18 hours

Definition of a space curve – Arc length – Tangent – Normal and binormal – Curvature and torsion – Contact between curves and surfaces – Tangent surface – Involutes and evolutes – intrinsic equations – Fundamental existence theorem for space curve – Helices.
Chapter 1: Sections 1 to 9

UNIT–II   INTRINSIC PROPERTIES OF A SURFACE   18 hours

Definition of a surface – Curves on a surface – Surface of revolution – Helicoids – Metric – Direction coefficients – Families of curves – Isometric correspondence – Intrinsic properties.
Chapter 2: Sections 1 to 9

UNIT–III   GEODESICS   18 hours

Geodesics – Canonical geodesic equations – Normal properties of geodesics – Existence theorem – Geodesic parallels – Geodesic curvatures – Gauss Bonnet theorem – Gaussian curvature – Surface of constant curvature.
Chapter 2: Sections 10 to 18

UNIT–IV   NON–INTRINSIC PROPERTIES OF A SURFACE   18 hours

The second fundamental form – Principal curvature – Lines of curvature – Developable – Developable associated with space curves and with curves on surface – Minimal surfaces – Ruled surfaces.
Chapter 3: Sections 1 to 8

UNIT–V   DIFFERENTIAL GEOMETRY OF SURFACES   18 hours

Fundamental equations of surface theory – Fundamental existence theorem for surfaces – Compact surfaces whose points are umbilics– Hilbert's lemma – Compact surfaces of constant curvature – Complete surfaces.
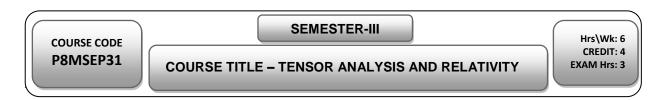*Chapter 3: Sections 9 to 10*
Chapter 4: Sections 1 to 5

CONTENT AND TREATMENT AS IN:

T. J. Willmore, (2002), An INTRODUCTION TO DIFFERENTIAL GEOMETRY, Oxford University Press, New Delhi.

REFERENCES:
1. *D. Somasundaram,* (2008), DIFFERENTIAL GEOMETRY – A FIRST COURSE, Narosa Publishing House, New Delhi.
2. *D. T. Struik,*(1950), LECTURES ON CLASSICAL DIFFERENTIAL GEOMETRY, Addison Wesley, Mass.
3. *Kobayashi and K. Nomizu,* (1963), FOUNDATIONS OF DIFFERENTIAL GEOMETRY, Inter science.

COURSE CODE P8MSEP31	SEMESTER-III COURSE TITLE – TENSOR ANALYSIS AND RELATIVITY	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives: The course aims to introduce vector algebra and vector calculus and special relativity and relativistic kinematics, dynamics and accelerated systems.

UNIT–I   TENSOR ALGEBRA   18 hours

Systems of Different orders – Summation Convention –Kronecker Symbols – Transformation of Coordinates in S_n– Invariants – Covariant and Contra variant vectors – Tensors of second order – Mixed Tensors –Zero Tensor– Tensor Field – Algebra of tensors – Equality of tensors – Symmetric and Skew– symmetric tensors – Outer multiplication, contraction and Inner multiplication –Quotient law of tensors – Reciprocal tensors of tensors – Relative tensor – Cross product of vectors.
Text Book – 1 : Chapter I: I.1 – I.3, I .7 and I.8, Chapter II: II.1 – II.19

UNIT–II   TENSOR CALCULUS   18 hours

Riemannian space – Christoffel symbols and their properties.
Text Book – 1 : Chapter III: III.1 and III.2

UNIT–III   TENSOR CALCULUS (Cont . . .)   18 hours

Covariant Differentiation of Tensors – Riemann–Christoffel Curvature Tensor.
Text Book – 1 : Chapter III: III.3 – III.4

UNIT–IV   SPECIAL THEORY OF RELATIVITY   18 hours

Galilean transformation – Maxwell's equation – The ether theory – The principle of Relativity.
RELATIVISTIC KINEMATICS: Lorentz transformation equations – Events and Simultaneity – Example – Einstein train – Time Dilation – Longitudinal Contraction – Invariant Interval – proper time and proper distance – World line – Example – Twin Paradox – Addition of Velocities – Relativistic Doppler Effect.
Text Book – 2 : Chapter 7 : Sections 7 .1 and 7.2

UNIT–V   RELATIVISTIC DYNAMICS   18 hours

Momentum – Energy – Momentum energy four vector – Force – Conservation of energy – Mass and energy – Example – Inelastic collision – Principle of Equivalence – Lagrangian and Hamiltonian Formulations.
ACCELERATED SYSTEMS: Rocket with constant acceleration – Example – Rocket with constant thrust.
Text Book – 2 : Chapter 7: Sections 7.3 and 7.4

CONTENT AND TREATMENT AS IN:

1. *U.C. De Absos Ali Shaikh and Joydeep Sengupta,*(2004),TENSOR CALCULUS, Narosa Publishing House, New Delhi.
2. *Donald T. Greenwood,* (1985), CLASSICAL DYNAMICS, Prentice Hall of India, New Delhi.

REFERENCES:

1. *J.L. Synge and A. Schild,* (1949), TENSOR CALCULUS, Toronto.
2. *David C Kay,* (2005), TENSOR CALCULUS, Schaum's Outlines, Tata McGraw Hill Publishing Company Ltd, New Delhi.
3. *A.S. Eddington,*(1930), THE MATHEMATICAL THEORY OF RELATIVITY, Cambridge University Press.
4. *P.G. Bergman,*(1942), AN INTRODUCTION TO THEORY OF RELATIVITY, New York.
5. *C.E. Weatherburn,* (1988), RIEMANNIAN GEOMETRY AND THE TENSOR CALCULUS, Cambridge.

COURSE CODE **P8MSEP32**	**SEMESTER-III** **COURSE TITLE – FUZZY SETS AND THEIR APPLICATIONS**	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives: The course aims to introduce Fuzzy sets and some operations on Fuzzy sets and also construction of Fuzzy sets.

UNIT–I   FUZZY SETS   18 hours

Fuzzy sets – Basic types – Basic concepts – Characteristics – Significance of the paradigm shift – Additional properties of α - Cuts
Chapter 1: Sections 1.3 to 1.5
Chapter 2: Section 2.1

UNIT–II   FUZZY SETS VERSUS CRISP SETS   18 hours

Representation of Fuzzy sets – Extension principle of Fuzzy sets – Operation on Fuzzy Sets – Types of Operation – Fuzzy complements.
Chapter 2: Sections 2.2 to 2.3
Chapter3: Sections 3.1 to 3.2

UNIT–III   OPERATIONS ON FUZZY SETS   18 hours

Fuzzy intersection – t-norms, Fuzzy unions – t-conorms – Combinations of operations – Aggregation operations.
Chapter 3: Sections 3.3 to 3.6

UNIT–IV   FUZZY ARITHMETIC   18 hours

Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Arithmetic operation on Fuzzy numbers – Lattice of Fuzzy numbers
Chapter 4: Sections 4.1 to 4.5

UNIT–V   CONSTRUCTION FUZZY SETS   18 hours

Methods of construction : An overview – Direct methods with one expert – Direct method with multiple experts – Indirect method with multiple experts and one expert – Construction from sample data.
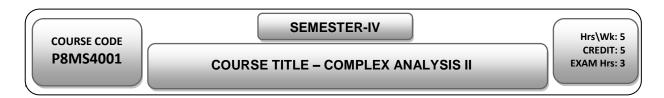*Chapter 10: Sections 10.1 to 10.7*
CONTENT AND TREATMENT AS IN:

G. J. Klir and Bo Yuan, (2005), FUZZY SETS AND FUZZY LOGIC: THEORY AND APPLICATIONS, Prentice Hall of India Ltd, New Delhi.

REFERENCES:

1. *H. J. Zimmermann,*(1996), FUZZY SET THEORY AND ITS APPLICATIONS, Allied Publishers, Chennai.
2. *A. Kaufman,* (1975), INTRODUCTION TO THE THEORY OF FUZZY SUBSETS, Academic Press, New York.
3. *V. Novak,* (1969), FUZZY SETS AND THEIR APPLICATIONS, Adam Hilger, Bristol.

COURSE CODE P8MS4001	SEMESTER-IV COURSE TITLE – COMPLEX ANALYSIS II	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

Objectives: To study Riemann Zeta function and normal families, Riemann mapping theorem, Conformal mapping of polygons, Harmonic functions, Elliptic functions and Weirstrass theory of analytic continuation.

UNIT–I   RIEMANN ZETA FUNCTION AND NORMAL FAMILIES   15 hours

The Product development – Extension of $\zeta(s)$ to the whole plane – The functional equation – The zeros of zeta function – Equicontinuity – Normality and compactness – Arzela's theorem – Families of analytic functions.
Chapter 5: Section 4: 4.1 To 4.4 Chapters 5: Section 5: 5.1 to 5.4.

UNIT–II   RIEMANN MAPPING THEOREM   15 hours

Statement and proof – Boundary Behaviour – Use of the Reflection Principle.
CONFORMAL MAPPING OF POLYGONS: The Behaviour at an angle – Schwartz Christoffel formula – Mapping on a rectangle.

HARMONIC FUNCTIONS: Functions with mean value property – Harnark's principle.
Chapter 6: Section 1: 1.1 to 1.3 ; Chapter 6 : Section 2: 2.1 to 2.3;
Chapter 6: Section 3: 3.1 and 3.2.

UNIT–III   ELLIPTIC FUNCTIONS   15 hours

Simply periodic functions – Doubly periodic functions.
Chapter 7: Section 1: 1.1 to 1.3; Chapter 7: Section 2: 2.1 to 2.4

UNIT–IV WEIRSTRASS THEORY 15 hours

The Weirstrass $\wp$-function – The functions $\zeta(z)$ and $\sigma(z)$ – The differential equation – The Modular function $\lambda(\tau)$ – The conformal mapping by $\lambda(\tau)$.
Chapter 7: Section 3: 3.1 to 3.5

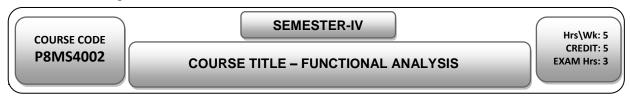## UNIT–V ANALYTIC CONTINUATIONS 15 hours

The Weirstrass theory – Germs and sheaves sections and Riemann surfaces – Analytic continuation along Arcs – Harmonic curves –The Monodromy theorem – Branch points.
Chapter 8: Section 1: 1.1 to 1.7.

CONTENT AND TREATMENT AS IN:
Lars V. Ahlfors, (2012), COMPLEX ANALYSIS, (Third Edition), McGraw Hill Book Company.

REFERENCES:
1. *H.A. Prestly,* (1990),INTRODUCTION TO COMPLEX ANALYSIS, Clarendon Press, Oxford.
2. *J.B.Conway,* FUNCTION OF ONE COMPLEX VARIABLE, Springer –Verlag, Narosa publishing co.
3. *S. Ponnusamy, (2000), FOUNDATIONS OF COMPLEX ANALYSIS,* Narosa Publishing House.

COURSE CODE **P8MS4002**	**SEMESTER-IV**	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3
	COURSE TITLE – FUNCTIONAL ANALYSIS	

Objectives: To study the details of Banach and Hilbert spaces and to introduce Banach algebras.

UNIT–I BANACH SPACES 15 hours

Definition and Some examples – Continuous Linear Transformations – The Hahn Banach Theorem – The Natural embedding of N in N^{**}.
Chapter 9: sections 46 to 49.

UNIT–II BANACH SPACES AND HILBERT SPACES 15 hours

Open Mapping Theorem – Conjugate of an operator – Definition and some simple properties of Hilbert spaces – Orthogonal complements- Orthonormal sets.
Chapter 9: Sections 50, 51.
Chapter 10 : Sections 52, 53,54.

UNIT–III HILBERT SPACES 15 hours

Conjugate space H^{*}– Adjoint of an operator – Self-adjoint operator – Normal and Unitary operators.
Chapter 10: Sections 55, 56, 57, 58.

UNIT–IV   GENERAL PRELIMINARIES ON BANACH ALGEBRAS   15 hours

Definition and some examples – Regular and singular elements – Topological divisors of zeros – The formula for the spectral radius.
Chapter 12: Sections 64 to 66 and 68.

UNIT–V   THE STRUCTURE OF COMMUTATIVE BANACH ALGEBRAS   15 hours

Gelfand Mapping – Applications of the formula $r(x) = \lim\|x^n\|^{1/n}$ – Involutions in Banach Algebras –Gelfand – Neumark Theorem.
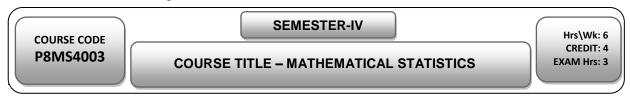*Chapter 13 : Section 70 to 73.*

CONTENT AND TREATMENT AS IN:

G.F. Simmons, (1963), INTRODUCTION TO TOPOLOGY AND MODERN ANALYSIS, McGraw Hill, New York.

REFERENCES:

1. *W. Rudin,* (1973), FUNCTIONAL ANALYSIS, Tata McGraw Hill, New Delhi.
2. S. *G. Bauhman and L. Narici,* (1966), FUNCTIONAL ANALYSIS, Academic Press, New York.
3. *H. C. Goffman and G. Fedrick,*(1987),FIRST COURSE IN FUNCTIONAL ANALYSIS, Prentice Hall of India, New Delhi.
4. *E. Kreyszig,* (1978), INTRODUCTORY FUNCTIONAL ANALYSIS WITH APPLICATIONS, John Wiley & sons, New York.
5. *D. Somasundaram, (2008),* A FIRST COURSE IN FUNCTIONAL ANALYSIS, Narosa Publishing House.

COURSE CODE P8MS4003	SEMESTER-IV COURSE TITLE – MATHEMATICAL STATISTICS	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives: This course introduces sampling theory, significance tests, estimation, testing of hypothesis, ANOVA and sequential analysis with rigorous mathematical treatment.

UNIT–I   SAMPLE MOMENTS AND THEIR FUNCTIONS   18 hours

Notion of a sample and a statistic – Distribution of the arithmetic mean of independent normally distributed random variables – the χ^2 distribution – the distribution of the statistic $(\overline{X}; S)$ – student t–distribution – Fisher's Z – distribution – Distribution of $\overline{X}$ from non–normal populations.
Chapter 9: Section 9.1 to 9.8.

UNIT–II   18 hours

SIGNIFICANCE TEST:
The theorems of Kolmogorov and Smirnov – Concept of a statistical test – Parameteric tests for small samples and large samples χ^2 test – The test of Kolmogorov and smirnov type – the

Wald Wolfovitz and Wilcoxon–Mann–Whitney tests – Independence tests by contingency tables.
Chapter 10: Section 10.11 ; Chapter 12: Section 12.1 to 12 .7

UNIT–III   ESTIMATION   18 hours

Preliminary notion – Consistent estimates – Unbiased estimates – Suffiency – Effciency – Asymptotically most efficient estimates – Methods of finding estimates – Confidence interval
Chapter 13: Sections 13.1 to 13.8

UNIT–IV   ANALYSIS OF VARIANCE   18 hours

One way classification and two way classification
HYPOTHESIS TESTING: Power functions and the OC function – Most powerful test – Uniformly most powerful test – unbiased test .
Chapter 15: Sections 15.1 and 15.2; Chapter 16: Sections 16.1 to 16 .5.

UNIT–V   SEQUENTIAL ANALYSIS   18 hours

SPRT – Auxiliary theorem – Wald's fundamental identity – OC function and SPRT – E(n) and determination of A and B – Testing a hypothesis concerning p on zero–one distribution – Testing a hypothesis concerning the expected value m of a Normal population.
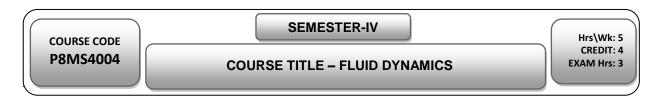*Chapter 17: Sections 17.1 to 17.9*

CONTENT AND TREATMENT AS IN:

M. Fisz, (1963), PROBABILITY THEOREY AND MATHEMATICAL STATISTICS, John Wiley and sons, New York.

REFERENCES:

1. *E.J. Dudewicz and S.N. Mishra,* (1963),MODERN MATHEMATICAL STATISTICS, John Wiley, New York.
2. *V. K. Rohatgi,* (1988), AN INTRODUCTION TO PROBABILITY THEORY AND MATHEMATICAL STATISTICS, Wiley Eastern.
3. *G.G. Roussas, (1973),* A FIRST COURSE IN MATHEMATICAL STATISTICS, Addison Wesley Publishing Company.
4. *B.L. Vander, (1968),* MATHEMATICAL STATISTICS, G. Allen & Unwin Ltd., London.

COURSE CODE P8MS4004	SEMESTER-IV COURSE TITLE – FLUID DYNAMICS	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objectives: This course aims to discuss kinematics of fluids in motion, equation of motion of a fluid, three dimensional flows and viscous flows.

UNIT–I   KINEMATICS OF FLUIDS IN MOTION   15 hours

Real fluids and ideal fluids – Velocity of a fluid at a point, Stream lines, path lines, steady and unsteady flows – Velocity potential – The vorticity vector – Local and particle rates of changes – Equations of continuity – Worked examples – Acceleration of a fluid – Conditions at a rigid boundary.
Chapter 2: Sections 2.1 to 2.10

UNIT–II   EQUATIONS OF MOTION OF FLUID   15 hours

Pressure at a point in a fluid at rest – Pressure at a point in a moving fluid – Conditions at a boundary of two inviscid immiscible fluids – Euler's equation of motion – Discussion of the case of steady motion under conservative body forces.
Chapter 3: Sections 3.1 to 3.7.

UNIT–III   SOME THREE DIMENSIONAL FLOWS   15 hours

Introduction – Sources, sinks and doublets – Images in a rigid infinite plane – Axis symmetric flows – Stokes stream function.
Chapter 4: Sections 4.1, 4.2, 4.3, 4.5.

UNIT–IV   SOME TWO DIMENSIONAL FLOWS   15 hours

Meaning of two dimensional flow – Use of Cylindrical polar coordinate – The stream function – The complex potential for two dimensional, irrational incompressible flow – Complex velocity potentials for standard two dimensional flows – Some worked examples – Two dimensional image systems – The Milne Thompson circle Theorem.
Chapter 5: Sections 5.1 to 5.8

UNIT–V   VISCOUS FLOWS   15 hours

Stress components in a real fluid – Relations between Cartesian components of stress – Translational motion of fluid elements – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric – Stress analysis in fluid motion – Relation between stress and rate of strain – The co-efficient of viscosity and Laminar flow – The Navier – Stokes equations of motion of a Viscous fluid.
Chapter 8: Sections 8.1 to 8.9.

CONTENT AND TREATMENT AS IN:
    F. Chorlton, (1985), TEXT BOOK OF FLUID DYNAMICS, CBS Publications, New Delhi.

REFERENCES:
1. *R. W. Fox and A. T. McDonald,* (1985), INTRODUCTION TO FLUID MECHANICS, Wiley.
2. *E. Krause,*(2005),FLUID MECHANICS WITH PROBLEMS AND SOLUTIONS, Springer.

COURSE CODE
P8MSEP41

Hrs\Wk: 5
CREDIT: 4
EXAM Hrs: 3

432.   **COURSE TITLE – NUMBER THEORY AND CRYPTOGRAPHY**
433.

Objectives: This course aims to give elementary ideas from number theory which will have applications in cryptography.

UNIT–I   SOME TOPICS IN ELEMENTARY NUMBER THEORY   15 hours

Time Estimates for doing arithmetic – Divisibility and Euclidean Algorithm – Congruence's – Some applications to Factoring.
Chapter I

UNIT–II   CRYPTOGRAPHY   15 hours

Some simple cryptosystems – Enciphering matrices.
Chapter III

UNIT–III   QUADRATIC RESIDUES   15 hours

Quadratics – Residues and reciprocity.
Chapter II

UNIT–IV   PUBLIC KEY   15 hours

The idea of Public key Cryptography – RSA – Discrete Law – Knapsack – Zero– Knowledge.
Chapter IV : Sections 1 to 4.

UNIT–V   PRIMALITY AND FACTORING   15 hours

Pseudo–primes – The rho method – Fermat factorization and factor bases – The continued fraction method – The quadraticsieve method.
Chapter V

CONTENT AND TREATMENT AS IN:

   Neal Koblitz,(1987),A COURSE IN NUMBER THEORY AND CRYPTOGRAPHY, Springer–Verlag, New York.

REFERENCES:

1. *Niven and Zuckerman,*(1976), AN INTRODUCTION TO THEORY OF NUMBERS, Third Edition, Wiley Eastern Ltd, New Delhi.
2. *David M. Burton,* (1989), ELEMENTARY NUMBER THEORY, Wm. C. Brown Publishers, Dubuque, Iowa.
3. *K. Ireland and M. Rosen,* (1972), A CLASSICAL INTRODUCTION TO MODERN NUMBER THEORY, Springer–Verlag.

COURSE CODE P8MSEP42	SEMESTER-IV	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – APPLIED ABSTRACT ALGEBRA	

Objectives: This course aims to explore the topics like lattices and their applications in switching circuits, finite fields, polynomials and coding theory.

UNIT–I   LATTICES   15 hours

Properties and examples of Lattices – Distributive lattices – Boolean algebras – Boolean polynomials – Minimal Forms of Boolean Polynomials.
Chapters: 1 to 4 and 6.

UNIT–II   APPLICATIONS OF LATTICES   15 hours

Switching Circuits - Applications of Switching Circuits
Chapters: 7 and 8.

UNIT–III   FINITE FIELDS AND POLYNOMIALS   15 hours

Finite fields
Chapter: 13.

UNIT–IV   FINITE FIELDS AND POLYNOMIALS   15 hours

Irreducible Polynomials over Finite fields - Factorization of Polynomials over Finite fields.
Chapters: 14 and 15.

UNIT–V   CODING THEORY   15 hours

Introduction to Coding - Linear Codes.
Chapters: 16 and 17.

CONTENT AND TREATMENT AS IN:

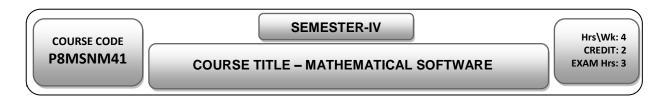> *Rudolf Lidl & Gunter Pilz,* (2006), APPLIED ABSTRACT ALGEBRA, Second Indian   Reprint
> Springer Verlag, New York.

REFERENCES:

1. A. Gill, *APPLIED ALGEBRA FOR COMPUTER SCIENCE*, Prentice Hall Inc., New Jersey.

2. J. L. Gersting, *MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE* (3rd Ed.), Computer Science Press, New York.
3. S. Wiitala, *DISCRETE MATHEMATICS- A UNIFIED APPROACH,* McGraw Hill Book Co.

COURSE CODE P8MSNM41	SEMESTER-IV COURSE TITLE – MATHEMATICAL SOFTWARE	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3

Objectives: This course aims to practice the students in Mathematics document preparation and utilizing the software facility available for tedious computations.
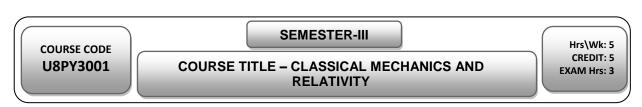
CREATING A DOCUMENT USING LATEX

- Title creation
- Page Layout
- Fonts
- List Structures
- Tables
- Include Images
- Header and Footer
- Mathematical Equations
- Bibliography Management.

MATLAB BASICS

- Algebra and Arithmetic
- Calculus, Graphics and Linear Algebra
- MATLAB Programming

REFERENCES:

1. LATEX MANUAL.
2. *Brain R. Hunt, Ronald R. Lipsman and Jonathan M. Rosenberg,* (2003), A GUIDE TOMATLAB FOR BEGINNERS AND EXPERIENCED USERS, Cambridge University Press.
3. *Rose L. Spencer,* INTRODUCTION TO MATLAB.

COURSE CODE U8PY3001	SEMESTER-III COURSE TITLE – CLASSICAL MECHANICS AND RELATIVITY	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

445.

Objective: This paper aims to impart the fundamental understanding of mechanics and their applications of different systems and also to impart the knowledge on theory of relativity and its applications.

UNIT -I

Rigid body- moment of inertia-radius of gyration-moment of inertia of a solid cylinder, Cylindrical shell- Solid sphere- Spherical shell- Compound pendulum – theory – equivalent simple pendulum – determination of g and k- points of suspension and oscillation are interchangeable.

Simple Harmonic motion- differential equation of SHM and its solutions-Kinetic, potential energy and total energy.

UNIT- II:

Centre of gravity of solid and hollow tetrahedron, solid and hollow hemisphere –Centre of pressure – vertical rectangular lamina – vertical triangular lamina – Meta centric height and its determination.

Hydrodynamics - Equation of continuity of flow – Venturimeter – Euler's equation of unidirectional flow – Torricelli's theorem – Bernoulli's theorem and its applications.

UNIT- III*

Mechanics for a system of particles - Constraints – Holonomic and non-holonomic constraints – Generalized co-ordinates – transformation equations – configuration space – Principle of virtual work – D' Alembert's principle – Lagrange's equation - Applications of Lagrange's equation - Simple pendulum – Compound pendulum – Bead sliding on a uniformly rotating wire - Atwood's machine.

UNIT- IV

Hamiltonian formulation of classical mechanics – phase space – Hamiltonian function – Hamilton's canonical equations of motion- Physical significance of Hamiltonian- Applications of Hamilton's equations of motion - Simple pendulum - Compound pendulum – linear harmonic oscillator, Principle and proof of least action.

UNIT- V

Relativity*

Frames of references – Negative result of Michelson Morley experiment – postulates of special theory of relativity – Galilean and Lorentz transformation – Length contraction – Time dilation and mass variation – Addition of velocity – Einstein's mass energy equivalence- Minkowski's four dimensional space-Time continuum.
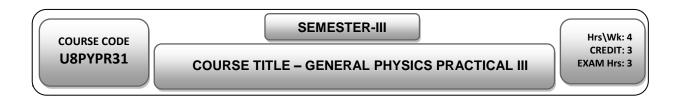
Books for study:
1. Mechanics and mathematical methods by R Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi,1990
2. Elements of mechanics by Gupta
3. M. Narayanamurti and Nagarajan, Dynamics, National Publication Company, 8th Edition, 2002,
4. Classical Mechanics by Gupta Kumar and Sharma,
5. Classical Mechanics by B D Gupta and SathyaPrakash, KedarNath Ram Nath& Co.,
6. S.G. Venkatachalapathy, Mechanics, MArgham Publicataion, 2003.

Books for Reference:

1. Mechanics by D S Mathur
2. Classical Mechanics by Goldstein, Narosa

*Note: Compulsory problem from UNIT III and V in section B

COURSE CODE U8PYPR31	SEMESTER-III COURSE TITLE – GENERAL PHYSICS PRACTICAL III	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

1. Young's modulus-Uniform Bending-Pin & Microscope.
2. Young's modulus-Cantilever-Depression- Static method-Scale and Telescope.
3. Rigidity modulus – Static Torsion.
4. Melde's string –Determination of frequency of a fork.
5. Sonometer-Determination of AC Frequency –steel wire.
6. Spectrometer - i-d curve –Determination of R.I of the material of the prism.
7. Potentiometer - Calibration of low range ammeter.
8. Air wedge- Determination of thickness of a thin wire.
9. Determination of M and B_H-Tan A position –Deflection and Vibration magnetometer.
10. Construction and study of low range power pack using two diodes.
11. Study of Analog and Digital multimeter (Testing of resistors, capacitors and diodes).
12. Figure of Merit of a Table galvanometer.

COURSE CODE U8PYAL31	SEMESTER-III COURSE TITLE - ALLIED MATHEMATICS I	Hrs\Wk: 7 CREDIT: 6 EXAM Hrs: 3

Objectives: To Explore the Fundamental Concept of Mathematics

UNIT– I   ALGEBRA   21 Hours

Partial Fractions – Binomial, Exponential and logarithmic Series (without Proof) – Summation and approximation.

UNIT– II   THEORY OF EQUATIONS   21 Hours

Polynomial Equations with real Coefficients –imaginary and Irrational roots – Solving equations with related roots –Formation of Equations– Equation whose roots are Symmetric functions of roots of a given equation by diminishing (or increasing) its roots by a constant – Reciprocal equations– Simple problems.

UNIT– III   MATRICES   21 Hours

Symmetric – Skew-symmetric – Orthogonal and Unitary matrices –Hermitian – Skew Hermitian – Rank of a matrix (upto order 4) – Consistency of equations – Eigen roots and eigen vectors – Cayley-Hamilton theorem (without proof) – verification – Computation of inverse matrix.

UNIT– IV   TRIGONOMETRY   21 Hours

Expansions of $\sin^n\theta$, $\cos^n\theta$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$–Expansions of $\sin\theta$, $\cos\theta$, $\tan\theta$ in terms of θ– Hyperbolic and inverse hyperbolic functions – Logarithms of complex numbers.
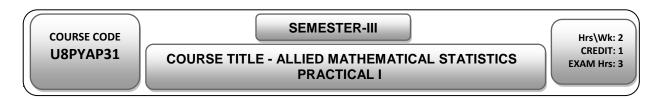
UNIT– V   DIFFERENTIAL CALCULUS   21 Hours

The nth derivatives – Leibnitz theorem (without proof) and applications – Jacobians – Polar coordinates – Curvature and radius of curvature in Cartesian and Polar co-ordinates.

CONTENT AND TREATMENT AS IN:
>   *P. Duraipandian and S. Udayabaskaran,* (1997), ALLIED MATHEMATICS, Vol. I & II, Muhil Publishers, Chennai.

REFERENCES
1. *P.Balasubramanian   and   K.G.   Subramanian,*   (1997),   ANCILLARY MATHEMATICS, Vol. I & II, Tata McGraw Hill, New Delhi.
2. *S.P. Rajagopalan and R. Sattanathan*, (2005), ALLIED MATHEMATICS, Vol. I & II, Vikas Publications, New Delhi.
3. *P. Kandasam and, K. Thilagavathy,* (2003), ALLIED MATHEMATICS, Vol. I & II, S.Chand& Company, New Delhi.

COURSE CODE U8PYAP31	SEMESTER-III COURSE TITLE - ALLIED MATHEMATICAL STATISTICS PRACTICAL I	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

1. Mean
2. Median
3. Mode
4. Standard Deviation, Quartile Deviation and Coefficient of Variation.
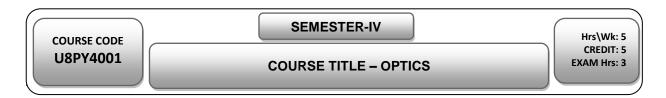5. Skewness and Kurtosis.

NOTE:

Use of Scientific Calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

CONTENT AND TREATMENT AS IN:

S. P. Gupta, STATISTICAL METHODS, Sultan Chand & Sons, New Delhi.

REFERENCES:

1. *R.V. Hogg and A.T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS, Macmillan.
2. *A. M. Mood, G. A. Graybiland, D.G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
3. *S. S. Wilks,* ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.
4. *S.C. Gupta and V.K.Kapoor,* FUNDAMENTAL OF APPLIED STATISTICS, Sultan & sons.

Objectives:

> *To make the students to understand the dual nature of light through the concepts of Geometrical and Physical Optics.*
> *To introduce important applications of interference, diffraction and polarization of light.*

UNIT-I: Aberration

Convex and Concave lens – Optic center – Cardinal points – spherical aberration – methods of minimizing spherical aberration – condition for minimum spherical aberration in the case of two lenses separated by a distance – chromatic aberration in lenses – condition for achromatism of two thin lenses in contact and out of contact –Coma- Astigmatism and distortion (concept only)- Eye piece- Ramsden's and Huygen's Eye pieces.

UNIT-II: Dispersion

Dispersion produced by a thin prism – angular dispersion – Dispersive power – Direct vision spectroscope-combination of prisms to produce- dispersion without deviation – deviation without dispersion – achromatic prism – constant deviation spectrometer – determination of refractive index of the material of the small angled prism – Irrational dispersion – Haloes – Cauchy's formula.

UNIT- III: Interference*

Theory of thin film- condition for bright and dark fringes – reflected light and transmitted light - colors of thin films – Reflected system – Air wedge – theory – Determination of diameter of a thin wire experimentally – test for optical flatness – Michelson's Interferometer – theory – Determination of wavelength and resolution of spectral lines- Newton's rings by reflected system of light (Theory) – Determination of wavelength of sodium light and refractive index using Newton's rings.

UNIT- IV: Diffraction

Zone plate- comparison of zone plate with convex lens – diffraction at circular aperture, straight edge – Fraunhofer diffraction at single and double slits – Plane diffraction grating –Theory- Determination of wavelength – Dispersive power of a grating – Difference between prism and grating- Rayleigh's criteria – Resolving power of a prism and grating.

UNIT-V: Polarization*

Brewster's law- Malu's law – Double refraction – Nicol Prism – construction and working- Nicol prism as a polarizer and analyzer – Huygen's explanation of double refraction

in uniaxial crystals –Production , detection and theory of plane, circularly and elliptically polarized light – optical activity – Fresnel's explanation – specific rotatory power – Determination of specific rotatory power by Laurent's half shade Polarimeter – Kerr and Faraday effect.
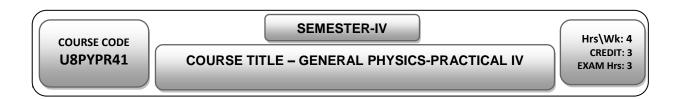
Books for Study:
1. Optics by Subramaniam N &BrijLal,- A text book of optics - S Chand & Co. Pvt. Ltd., New Delhi, 2010
2. Optics and Spectroscopy by Murugeshan. - S Chand & Co. Pvt. Ltd., New Delhi. 5th Edition 2005
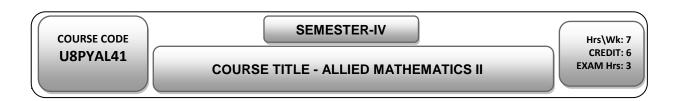
Books for Reference:
1. Optics by Khanna D R &Gulati H R, R Chand & Co. Pvt. Ltd., New Delhi, 1979
2. C.L Arora – Optics – S. Chand & Co. Pvt. Ltd., New Delhi. Ist Edition
3. Ajay Ghatak – Optics – McGraw Hill , 3rd Edition, 1996
4. G. Aruldas – Molecular structure and spectroscopy – Printice Hall India, 2nd Edition, 2008

*Note: Compulsory problem from UNIT III and V in section B

COURSE CODE **U8PYPR41**	**SEMESTER-IV** **COURSE TITLE – GENERAL PHYSICS-PRACTICAL IV**	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3

1. Young's modulus-Uniform Bending –Scale and Telescope.
2. Young's modulus-Cantilever - Depression-Dynamic method- Pin and Microscope.
3. Compound pendulum –Determination of 'g' and 'K'.
4. Sonometer –Determination of AC Frequency –Brass wire.
5. Spectrometer –Grating - Minimum deviation position-determination of N and λ.
6. Potentiometer –Determination of resistance and specific resistance of a coil.
7. Air wedge –Determination of thickness of enamel coating.
8. Determination of M and B_H –Tan B Position –Deflection and Vibration magnetometer.
9. Construction and study of regulated power supply using Zener diode.
10. Construction and study of regulated power supply using IC (7805).
11. Study of Analog and Digital Multimeter (Testing of transistors and fault finding in power supply)
12. Figure of Merit –Ballistic Galvanometer.

COURSE CODE	SEMESTER-IV	Hrs\Wk: 7
U8PYAL41		CREDIT: 6
	COURSE TITLE - ALLIED MATHEMATICS II	EXAM Hrs: 3

Objectives: To Explore the Fundamental Concept of Mathematics

UNIT– I   INTEGRAL CALCULUS   21 Hours

Properties of definite integrals – Integration by parts – Reduction formulae $\left(\int \sin^n x \, dx, \int \cos^n x \, dx \text{ only}\right)$ –Simple Problems.

UNIT– II   PARTIAL DIFFERENTIAL   21 Hours
**   EQUATIONS**

Formation – Complete integrals and general integrals – Four standard types, Lagrange's equation.

UNIT– III   LAPLACE TRANSFORMS   21 Hours

Laplace Transformations of standard functions and simple properties – Inverse Laplace transforms – Simple problems.

UNIT– IV   VECTOR ANALYSIS   21 Hours

Scalar point functions – Vector point functions – Gradient, divergence and curl – Directional derivatives –Line, Surface and Volume integrals – Guass, Stoke's and Green's theorems (Statement only).

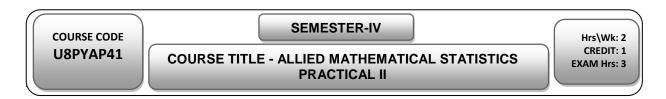**UNIT– V   FINITE DIFFERENCES AND OPERATORS   21 Hours**

First and Higher order differences – Forward and Backward difference – Properties of operators – Difference of a polynomial – Factorial polynomials – Operator E–Relation between Δ ,∇ and E.

CONTENT AND TREATMENT AS IN:

P. Duraipandian and S. Udayabaskaran, (1997), ALLIED MATHEMATICS, Vol. I & II, Muhil Publishers, Chennai. *B.D. Gupta*, (2001), NUMERICAL ANALYSIS, Konark Pub. Ltd., Delhi.

REFERENCES

1. *P.Balasubramanian and K.G. Subramanian,* (1997), ANCILLARY MATHEMATICS, Vol. I & II, Tata McGraw Hill, New Delhi.
2. *S.P. Rajagopalan and R. Sattanathan*, (2005), ALLIED MATHEMATICS, Vol. I & II, Vikas Publications, New Delhi.
3. *P. Kandasamy and K. Thilagavathy,* (2003), ALLIED MATHEMATICS, Vol. I & II, S. Chand & Company, New Delhi.

| COURSE CODE | SEMESTER-IV | Hrs\Wk: 2 |
| **U8PYAP41** | COURSE TITLE - ALLIED MATHEMATICAL STATISTICS PRACTICAL II | CREDIT: 1 EXAM Hrs: 3 |

1. Coefficient of correlation, Rank correlation.
2. Multiple Correlation.
3. Partial Correlation.
4. Regression equations.
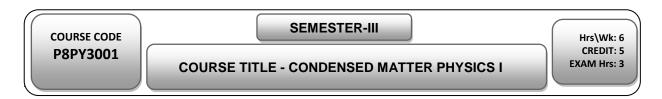5. χ^2 test of Independence of attributes (2×2 contingency table only).

NOTE:

Use of Scientific Calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

CONTENT AND TREATMENT AS IN:

S. P. Gupta, STATISTICAL METHODS, Sultan Chand & Sons, New Delhi.

REFERENCES:

1. *R.V. Hogg and A.T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS,Macmillan.
2. *A. M. Mood, G. A. Graybiland, D.G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
3. *S. S. Wilks,*ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.
4. *S.C. Gupta and V.K.Kapoor,*FUNDAMENTAL OF APPLIED STATISTICS,Sultan & sons.

Objective: This paper aims to give an understanding of the basic theoretical models to study the properties of matter from a microscopic point of view

UNIT- I: Diffraction and Reciprocal lattice

Types of lattices- symmetry elements- Point and Space Groups- Bravais Lattices- Simple crystal structure- Atomic packing Factor (SC, BCC, FCC,HCP) – Crystal diffraction – Bragg's law – Scattered Wave Amplitude – Reciprocal Lattice (SC, BCC, FCC) – diffraction Condition – Laue equation – Types of crystal bonding.

UNIT- II: Lattice vibration and Phonons

Vibrations of crystal lattices –mono atomic and diatomic one dimensional lattice, phonon momentum – Inelastic scattering by phonons- Debye theory of specific heat, thermal expansion and thermal conductivity –Umkalapp Process.

UNIT- III: Free electron theory of metals

Free electron in solids-Drude Lorentz free electron theory – Wiedemann-Franz law- Free electron gas in three dimension-Fermi Dirac distribution function - Density of states –Fermi surface, Fermi gas at T=0K- Specific heat capacity of electrons in metals.

UNIT- IV: Band theory of solids

Band structure of solids- Electron in periodic potentials-Bloch's theorem –Kroning-Penny model- Brillouin zones- Semiconductors-concept of hole and concept of effective mass-Intrinsic carrier concentration-Temperature dependence- Mobility-Impurity conductivity-Hall effect– Experimental method in Fermi surface studies-de Hass-van Alphen effect

UNIT- V: Super conductivity

Superconductivity: Occurrence – Effect of magnetic fields-Meissner effect – Entropy and heat capacity- Type I and II superconductors.
Thermodynamics of super conducting transition – London equation – Coherence length – Cooper pairs – BCS Theory – Single particle tunneling- Josephson tunneling – DC and AC Josephson effect – flux quantization – SQUIDS – high temperature superconductors.
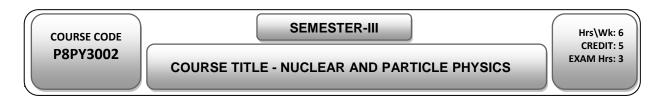
Books for Study

1. S.O.Pillai-Solid State Physics- Seventh edition- New Age International Pvt Ltd. Publisher
2. K.Ilangovan - Solid State Physics- MJPublication (2012)
3. Charles Kittel Introduction to Solid State Physics- Eight edition (2012)- Wily Eastern Ltd, New York

4. Solid State Physics-Gupta kumar

BOOKS FOR REFERNCE:

1. **G.K. Narula, K.S.Narula** and **V.K.Gupta**, 1988, *Materials Science*, Tata McGraw-Hill.
2. **Lawrence H. Van Vlack**, 1998, *Elements of Materials Science and Engineering*, 6th Edition, second ISE reprint, Addison-Wesley
3. **H. Iabch and H.Luth**, 2001, *Solid state Physics – An introduction to principles of Material Science*, 2nd Edition, Springer
4. **S.L Kakani and Amit Kakani,** 2006, *Material Science*, New Age International Publishers

COURSE CODE P8PY3002	SEMESTER-III	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3
	COURSE TITLE - NUCLEAR AND PARTICLE PHYSICS	

Objective: This paper aims to explore the understanding of the nuclear models and various physical properties of nucleus.

UNIT- I: Nuclear Forces

Central and non central forces- Meson theory of nuclear force- Yukawa potential- Spin dependence of nuclear forces-Charge independence of nuclear forces-Isospin formalism-Ground state of deuteron.

UNIT- II: Nuclear Models

Liquid drop model-Bohr Wheeler theory of nuclear fission-Shell model-Spin orbit coupling-Magic numbers-Application of shell model-Angular momentum-Magnetic moment-parity-Collective model of Bohr and Mottleson.

UNIT- III: Nuclear Reaction

Types of nuclear reactions-Conservation laws-Q - value equation-scattering and partial wave analysis of cross section-Compound nucleus-Energy level of nuclei-level width and de-excitation- Reciprocity theorem- Briet - Wigner dispersion formula.

UNIT- IV: Beta and Gamma Decay

Beta decay: Fermi theory of beta decay-Shape of the beta spectrum-Total decay rate-Mass of neutrino-Angular momentum and parity - selection rules - Non conservation of parity.
Gamma decay: Multi pole transition in nuclei-Angular momentum and parity - selection rules- Internal conversion-Pair production-Nuclear isomerism.

UNIT- V: Elementary Particle Physics

Classification of elementary particles- Types of interaction between elementary particle-Hadrons and Leptons-Symmetry and conservation laws –CPT Theorem-SU(2)-SU(3) multiplets- Quark model-Gell-Mann –Okubo mass formula for octet and decuplet of hadrons.
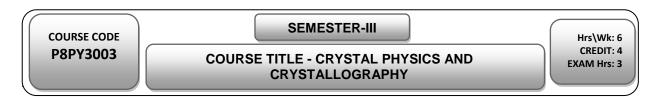
Books for Study
1 .Nuclear Physics-R.R.Roy and B.P.Nigam, Wily Eastern Ltd, New York
2. Nuclear Physics-D.C.Tayal, Himalya Publications, Bombay
3. Nuclear Physics vol II- S.N.Ghosal, S.chand & co New Delhi
4. Nuclear Physics – Pandiya and Yadav, 2nd Edition, kedar nath and Ram nath publication

Books for reference:
1. **H. A. Enge**, 1983, *Introduction to Nuclear Physics*, Addison-Wesley, Tokyo
2. **Y. R. Waghmare**, 1981, *Introductory Nuclear, Physics*, Oxford-IBH, New Delhi.
3. **Ghoshal**, *Atomic and Nuclear Physics*, Vol. 2
4. **J. M. Longo**, 1971, *Elementary particles*, McGraw-Hill, New York.
5. **R. D. Evans**, 1955, *Atomic Nucleus*, McGraw-Hill, New York.
6. **I. Kaplan**, 1989, *Nuclear Physics*, Narosa, New Delhi
7. **B. L. Cohen**, 1971, *Concepts of Nuclear Physics*, TMH, New Delhi

   WEB SITES
1. http://ocw.mit.edu/OcwWeb/Physics/8-701Spring 2004/Lecture notes
2. http://faraday.physics.utoronto.ca/General Interest/D.Bailey/SubAtomic/ Lectures/ Lect.html

| COURSE CODE | SEMESTER-III | Hrs\Wk: 6 |
| P8PY3003 | COURSE TITLE - CRYSTAL PHYSICS AND CRYSTALLOGRAPHY | CREDIT: 4 EXAM Hrs: 3 |

Objective: *This paper aims to give an understanding of the Crystal Structure, Properties and Refinement Techniques.*

UNIT- I: X-ray Diffraction

X-ray – generation – Ewald`s sphere – X- ray diffractometer – four circle diffractometer – X-ray detector – image plate - data collection – X- ray diffraction of crystal lattice – Coherent scattering of X-ray by electron – Scattering by one atom - diffraction from a one dimension crystal – Laue formulae of X- ray diffraction.

UNIT- II: Diffraction Techniques

Laue diffraction – orientation – calculating Laue angles –Rotating crystal method – X- ray powder diffraction- principle- methods of powder diffraction pattern –interpretation of powder photographs – applications and limitation of X- ray powder diffraction.

UNIT- III: Determination of Crystal Structure

Scattering factor –structure factor- determination of structure factor –amplitude from intensities- data reduction – crystallization – crystal mounting – collection of Bragg's intensities – phase problem – need for phase – Patterson method –heavy atom technique – anomalous dispersion – direct method procedure –Fourier map.

UNIT- IV: Refinement of Crystal Structure

Weighting scheme – residual indices – least square refinement – thermal parameters – Wilsons plot – space group determination – structure refinement - structural analysis – bond length - bond angle - torsion angle - confirmation of rings

UNIT-V: Melt and Vapor Growth techniques
Growth from melt- Bridgman, Czochralski, zone melting – Verneuil techniques- Physical vapor deposition – flux growth – chemical vapor deposition – chemical vapor transport – hydrothermal growth – Epitaxial growth.
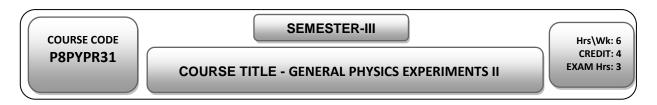
Book for study:
1. D. Velmurugan , Elementary Crystallography ,MJP publisher, Chennai
2. Santhanaraghavan P. and Ramasamy P., crystal growth process and methods, Kumbakonam, KRU Publication 2000.

Books for Reference:

1. **N. W. Aschroft** and **N. D. Mermin**, *Solid State Physics,* Rhinehart and Winton, New York.
2. **A. J. Dekker**, *Solid State Physics*, Macmillan India, New Delhi.

3. **S. O. Pillai**, 1997, *Solid State Physics*, New Age International, New Delhi.
4. **S. O. Pillai**, 1994, *Problems and Solutions in Solid State Physics,* New Age International, New Delhi.
5. **J. P. Srivastava,** 2001, *Elements of Solid State Physics,* Prentice-Hall of India, New Delhi.
6. **A.Wahab,** 2009, *Solid State Physics*, Narosa Publishing House, New Delhi.
7. **Saxena, Gupta, Saxena**, 2003, *Solid State Physics*, Pragati Prakashan, Meerut.

COURSE CODE P8PYPR31	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE - GENERAL PHYSICS EXPERIMENTS II	

(Any 10 out of the given 15)

1. GM counter – Characteristics, inverse square law.
2. G.M. Counter - absorption coefficient.
3. Michelson Interferometer – Wavelength, separation of wavelengths
4. Michelson Interferometer - thickness of mica sheet.
5. F.P. Etalon – using Michelson set up.
6. Hall Effect.
7. Molecular spectra – ALO band.
8. Molecular spectra – CN Band.
9. Susceptibility by Quincke's method.
10. Susceptibility by Guoy's method.
11. Ultrasonic Interferometer – Velocity and Compressibility of a liquid.
12. Ultrasonic Diffraction - Velocity and Compressibility of a liquid.
13. Dielectric measurements in Microwave test bench.
14. B-H curve using CRO.
15. Spectral analysis of a salt.

Objective: To introduce to the rapidly developing field of nanoscience and technology with special focus on fabrication techniques, properties of nanostructures and applications of nanomaterials

Unit I: Introduction to Nanoscience: Definition of Nano, Scientific revolution-Atomic Structure and atomic size, emergence and challenges of nanoscience and nanotechnology, carbon age-new form of carbon (CNT to Graphene), influence of nano over micro/macro, size effects and crystals, large surface to volume ratio, surface effects on the properties.

Unit II: Nucleation and Crystal Structure

Nucleation – Different kinds of nucleation - Concept of formation of critical nucleus – Classical theory of nucleation - Spherical and cylindrical nucleus- Types of nanostructured material- One dimensional, Two dimensional and Three dimensional nanostructured materials, Quantum Dots shell structures, metal oxides, semiconductors, composites, mechanical-physical-chemical properties.

Unit III: Synthesis- Physical and chemical approaches
High energy Ball milling – Physical vapour Deposition(PVD) – Ionised cluster beam deposition – Sputter deposition – DC and RF – Chemical vapour deposition(CVD) – Molecular beam Epitaxy(MBE) – Sol-gel method – Hydrothermal synthesis – Langmuir Blodgett (LB) method.

Unit IV: Characterization techniques
Basics of X-ray diffraction – Scanning Electron microscope(SEM) – Transmission Electron Microscope(TEM) – Scanning probe and tunneling microscope – Atomic Force Microscope(AFM) – UV-Vis- NIR spectrometer – Infra Red spectrometer – Fourier Transform Infra Red Spectrometer(FTIR) – Raman spectroscopy – Photoluminance spectrometer.
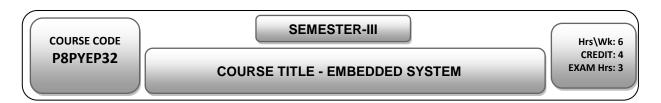
Unit V: Application of Nanomaterials
Coulomb Blockade – Single Electron Transistor (SET) – Metal oxide Semiconductor Field Effect Transistor(MOSFET) – Spintronics – Excitons – Optical properties of Semiconductor nanoparticles – Giant Magneto Resistance(GMR) – Magnetic Tunnel Junction(MTJ) – Spin Field effect transistor(SFET).

Books for Study:
1. Sulabha K. Kulkarni, Nanotechnology Principles and Practices, Sep-2006
2. M.A. Shah &Tokeer Ahmed, Principles of Nanoscience and Technology, 2010-Narosa Publication
3. A.K. Bandyopadhyay, Nano materials

For References:

1. C.N.R.Rao, A.Muller, A.K.Cheetham (Eds), *The chemistry of nanomaterials: Synthesis, properties and applications*, Wiley VCH Verlag Gmbh&Co, Weinheim, 2004.
2. Kenneth J. Klabunde (Eds), *Nanoscale Materials Science*, John Wiley & Sons, InC, 2001.
3. C.S.S.R.Kumar, J.Hormes, C.Leuschner, *Nanofabrication towards biomedical applications,* Wiley –VCH Verlag GmbH & Co, Weinheim, 2004.
4. W. Rainer, *Nano Electronics and information Technology*, Wiley, 2003.
5. K.E.Drexler, *Nano systems*, Wiley, 1992.
6. G.Cao, *Naostructures and Nanomaterials: Synthesis, properties and applications*, Imperical College Press, 2004.
7. Jeremy Ramsden, *Essential of Naotechnology* Jeremy Ramsden and Ventus Publications ApS, 2009.
8. Ben Rogers , Jesse Adams , Sumita Pennathur, Nanotechnology – Understing of Small Systems, CRC Press, Taylor & Francis Group, 2015
9. Sulabha K. Kulkarni, Nanotechnology: Principles and Practices, Third Edition, Capital Publishing Company, 2006.
10. M. Wilson, K. Kannangara, G Smith, M. Simmons, B. Raguse, *Nanotechnology: Basicscience and Emerging technologies*, Overseas Press India Pvt Ltd, New Delhi, First Edition, 2005.

COURSE CODE P8PYEP32	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE - EMBEDDED SYSTEM	

Objective: This paper aims at introducing the learner to the very popular Intel 8051, the PIC24 family and the widely used ARM embedded processor

UNIT- I: 8051: Architecture

Microprocessor Vs Microcontroller – Types of Microcontrollers - 8051 Architecture – 8051 Microcontroller hardware - input/output pins – Memory Organization – Ports & Circuits – Counters – Timers – Serial data input/output – Interrupts, Operand types and Operand addressing.

UNIT- II: 8051: Instruction Set

Addressing modes – Data transfer instructions- Data and Bit manipulation instructions – arithmetic instructions – Instruction for logical operations, Internal RAM, and SFRs – program flow control instructions – Interrupt control flow

UNIT- III: 8051: Interfacing and Applications

Interfacing external memory – Keyboard and display devices – LED -7-segment LED display – 2- phase 6-wire stepper motor – interfacing Programmable Peripheral Interface (PPI) device 8255 – Interfacing analog to digital converter 0801 with 8051.

UNIT- IV: PIC18/24 Architecture

Architecture – memory organization – addressing modes – instruction set –PIC programming in Assembly & C – input/output port, data conversion, RAM &ROM allocation -timer programming, MP – LAB
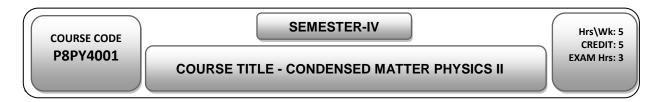
UNIT-V: ARM Architecture

Arm architecture – ARM core signal description – ARM core families – Registers - Pipeline – Thumb instruction set – ARM instruction set – internal memories - Peripherals

Book for Study:

1. Programming and customizing the 8051 microcontroller by Michael Predko, McGraw – Hill (1999)
2. PIC microcontroller and embedded system: using assembly and C for PIC18 by Muhammad Ali Mazidi, Rolin D, McKinlay, Danny Pearson Prentice Hall (2008)
3. Real Time Embedded System, Cranes Software International Ltd. Bangalore
4. Introduction to Embedded systems Shibu K V , Tata McGraw Hill, New Delhi

Book for References:

1. Embedded System by Raj Kamal, TMH, 2006

2. The 8051 Microcontroller By K Ayala 3rd Ed., Thomson Delmer Learning 2007
3. PIC Microcontroller by H.W Huang, Delmar CENGAGE Learning, 2007

COURSE CODE P8PY4001	**SEMESTER-IV**	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3
	COURSE TITLE - CONDENSED MATTER PHYSICS II	

Objective: *This paper aims to give an understanding of the advance theoretical models to study the properties of matter from a microscopic point of view.*

UNIT- I: Dielectrics

Dielectric solids- Different types of polarization, frequency and temperature effects on polarization-Dielectric loss and Dielectric Breakdown - Local or internal field-Clausius Mosotti equation-determination of dielectric constant- Classification and applications of dielectric materials – piezoelectric and ferroelectric materials.

UNIT- II: Magnetism I:

Definitions of Magnetism-Classification – Langevian theory of Dia magnetism(classical theory)-Quantum theory of Dia Magnetism-classical theory of paramagnetism - Quantum theory of paramagnetism- Rare earth ion - Quenching of orbital angular momentum – Adiabatic demagnetization.

UNIT- III: Magnetism II:

Quantum theory of ferromagnetism – Curie point- Heisenberg's interpretation of Weiss field – Ferromagnetic spin waves- Quantization of spin wave-Thermal excitation of magnons-Ferromagnetic domain-Origin of domains– Bloch wall (Domain wall energy)-Theory of antiferomagnetism – Neel temperature- Susceptibility below Neel temperature.

UNIT- IV: Optical Properties

Optical reflectance - Kramers- Kronig relation-Electronic interband transitions-Drude relation for optical conductivity – optical absorption in metals, insulator and semiconductor - Excitons -Frenkel and Mott-Wannier Excitons – luminescence- photoluminescence-electroluminescence.

UNIT- V: Surface Physics

Surface structure-simple super lattice-Incoherent Lattice- low energy electron diffraction-Lattice dynamics at surfaces- Surface Polarization-Localized modes-surface electronic states-Richardson-Dushman equation.
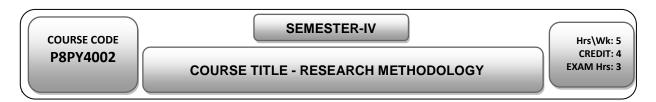
Books for Study

1. Solid State Physics- S.O.Pillai

2. Solid State Physics-K.Ilangovan
3. Introduction to Solid State Physics- Charles Kittel
4. Solid State Physics-Gupta kumar

Books for reference:

1. **N. W. Aschroft** and **N. D. Mermin**, *Solid State Physics,* Rhinehart and Winton, New York.
2. **A. J. Dekker**, *Solid State Physics*, Macmillan India, New Delhi.
3. **S. O. Pillai**, 1997, *Solid State Physics*, New Age International, New Delhi.
4. **S. O. Pillai**, 1994, *Problems and Solutions in Solid State Physics,* New Age International, New Delhi.
5. **J. P. Srivastava,** 2001, *Elements of Solid State Physics,* Prentice-Hall of India, New Delhi.
6. **A.Wahab,** 2009, *Solid State Physics*, Narosa Publishing House, New Delhi.
7. **Saxena, Gupta, Saxena**, 2003, *Solid State Physics*, Pragati Prakashan, Meerut.

COURSE CODE P8PY4002	SEMESTER-IV	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE - RESEARCH METHODOLOGY	

Objective: This paper aims at introducing the learner to understand the various methodologies used in Research to analyse the data.

UNIT – I: RESEARCH METHODOLOGY
Meaning of research – Objectives of research – motivation of research – Types of research- research approaches and significance of research – Research Methods versus methodology – Research and scientific methods.

UNIT – II: RESEARCH PROBLEM
Research process – Formulating the research problems- Extensive literature survey- Development of working hypothesis- Criteria for good research.
Research Problem - Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem.

UNIT – III: RESEARCH DESIGN AND DATA COLLECTION
Meaning of research design – Need and features of good design – Concepts relating to research design – Basic principles of experimental design - Data collection methods- Experiment and survey- collection of primary and secondary data – The uses of computers in research.

UNIT – IV: STATISTICAL APPLICATIONS IN RESEARCH
Mean -Median – Mode - Geometric mean - Harmonic mean – Average deviation - standard deviation – Correlation –linear correlation -coefficient of correlation-computation coefficient of correlation- Chi square tests for comparing variance-non parametric test.
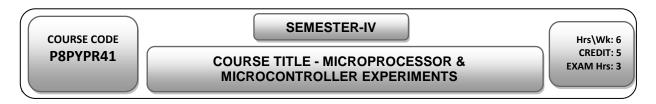
UNIT – V: RESEARCH COMMUNICATION

Meaning of research report – Logical format for writing thesis and paper – Essentials of scientific report: abstract, introduction, review of literature, materials and methods and discussion – Write up steps in drafting report.

Books for Study:

1. Research Methodology, Methods and techniques – C.R. Kothari – Vishwa Prakasam Publications, II Edition.
2. Research Methodology, Methods and techniques – C.R. Kothari- New Age Publications.
3. Advanced Research Methodology –Dr Ranjit khaur Bhalla & Dr Mohit Puri- Kanishka publishers, New Delhi.
4. Research Methodology-R.Paneerselvam –PHI Learning Private limited. New Delhi, second Edition

   Book for Reference:
1. Research: An introduction – Robert Ross – Harper and Row Publications.
2. Research Methodology – P.Saravanavel – Kitlab Mahal, Sixth Edition.
3. A Hand book of Methodology of Research – Rajammal P.A.Devadass - Vidyalaya Press.
4. Statistical methods – G.W. Snedecor and W.Cocharan – Oxford and IBH, New Delhi.

COURSE CODE P8PYPR41	SEMESTER-IV COURSE TITLE - MICROPROCESSOR & MICROCONTROLLER EXPERIMENTS	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

MICROPROCESSOR & MICROCONTROLLER
(Any 10 out of the given 15)

1. Number conversion - 8 bit and 16 bit: BCD to binary, Binary to BCD, Hex to ASCII using 8085 & Microcontroller.
2. Square and square root of BCD and HEX numbers 8 bit and 16 bit using 8085 & Microcontroller.
3. Addition and subtraction using 8086 & Microcontroller.
4. Multiplication and division using 8086 & Microcontroller.
5. Sum of a simple series.
6. Ascending order / descending order using 8085 & Microcontroller
7. Time delay subroutine and a clock programme.
8. Double and Triple precision addition and subtraction using 8085/8086.
9. Switching an array of LED's by programming & Microcontroller.
10. Op-Amp 8-bit DAC.
11. ADC interfacing 0809 with MPU & Microcontroller.
12. Interfacing and programming 0800 with MPU.
13. Analog to digital conversion using DAC comparator and MPU system.
14. Wave form generation – Asymmetrical square wave and ramp.
15. Interfacing a stepper motor to the MPU system – clockwise and anticlockwise – full stepping and half stepping & Microcontroller.

Objective: The students are exposed to the wide applications of microprocessors like 8085, 8086 and interfacing them.

UNIT-I: 8085 Microprocessor & Instruction Set

Introduction to Microcomputer-Memory- ROM- RAM- Bus Structure- Registers- Internal Architecture and Flags- Addressing modes- Classification of instructions and format: data transfer, arithmetic, logical – special instruction and branch instructions –- stack and subroutine instructions - Logical rotate and compare instructions –I/O and Machine control instruction.

UNIT- II: Interfacing

Memory interface- Basic- 2K X 8 EPROM , 4K x 8 ROM and 2K X 8 RAM interface - programmable peripheral interfacing device 8255 – Block diagram-control word-BSR mode-Interfacing 8255 to 8085-Interfacing –LED Interface-Traffic Light control-Temperature controller-Direct Memory Access(DMA).

UNIT – III: 8086 Microprocessor – Architecture and Interrupts

Introduction — Internal Architecture of the 8086/– Minimum mode and maximum-mode system —.

INTERRUPTS IN 8086 MICROPROCESSOR: Types of interrupts – Interrupt Address Pointer Table – Interrupt related instructions — External hardware interrupt interface —– Software interrupt – Non-Maskable interrupt — Internal interrupt functions.

UNIT- IV: Programming – Software Model of the 8086

Instruction set – Data transfer instructions – arithmetic, logic, flag, shift, rotate instructions – compare, jump instructions – Subroutines – handling instructions – loop and string instructions – Addressing modes.

UNIT – V: ARCHITECTURE AND INSTRUCTION SET OF MICROCONTROLLER

Architecture of 8051 microcontroller – Internal and External memories – Counters and Timers – Synchronous serial-cum-asynchronous serial communication. Basic assembly language programming – Data transfer instructions – Data and Bit manipulation instructions – Arithmetic instructions – Instructions for Logical operations.
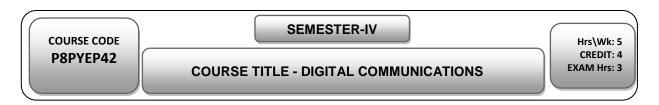
Books for study

1. Ramesh Goanker: Microprocessor Architecture, Programming & Applications with the 8085/8080A – Wiley Eastern Ltd.
2. V.Vijayendran, Fundamentals of Microprocessor – 8086 Architecture, Programming and Interfacing, Chennai.
3. Douglas V. Hall: Microprocessors Interfacing, Programming & Hardware – Tata McGraw-Hill.

4. B.Brey – Intel Microprocessors: 8086/8088, 80186, 80286, 80386, and 80486: Architecture, Programming and Interfacing, 3rd Ed, EEE, 1995.
5. Mohamed Rafiquizzman: Microprocessors and Microcomputer Based System Design UBS, 1990.
6. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education, 2005.
7. The 8051 Microcontroller and Embedded Systems – Mazidi and Mazidi, PHI,2000.

Books for reference

1. Glenn A. Gibson & Yu-Cheng Liu: Microcomputers for engineers and Scientists – Presentic-Hall Inc.
2. Dougles V. Hall: Microprocessors & Digital Systems –McGraw- Hill Book Company.
3. Stwart M.Asser: Microcomputer servicing – Practical systems and trouble shooting – All India Traveller Book Company.
4. Yu – Chang Liu & Glenn A. Gibson: Microcomputer systems: The 8086/8088 family Architecture programming & design – Printice-Hall of India.

COURSE CODE P8PYEP42	SEMESTER-IV COURSE TITLE - DIGITAL COMMUNICATIONS	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objective: *To expose the students to the principles and working of digital communication systems using different techniques using digital instrumentation.*

UNIT-I: Elements of Digital Communication Systems:

Elements of Digital Communication Systems: Model of Digital Communication Systems - Digital Representation of Analog Signal - Certain issues in Digital Transmission - Advantages of Digital Communication Systems - Bandwidth-S/N tradeoff - Hartley Shannon Law - Sampling Theorem

UNIT-II: Pulse Code Modulation:

Pulse Code Modulation: PCM Generation and Reconstruction - Quantization noise - Non uniform Quantization and Companding – DPCM - Adaptive DPCM - DM and Adaptive DM – Noise in PCM and DM.

UNIT -III: Digital Modulation Techniques:

Digital Modulation Techniques: Introduction – ASK - ASK Modulator, Coherent ASK Detector - Non-Coherent ASK Detector - FSK, Bandwidth and Frequency Spectrum of FSK - Non coherent FSK Detector - Coherent FSK Detector - FSK Detection Using PLL – BPSK - Coherent PSK Detection - QPSK, Differential PSK.

UNIT- IV: Baseband transmission and Optimal Reception of Digital Signal:

Baseband transmission and Optimal Reception of Digital Signal: Pulse shaping for optimum transmissions - A Baseband Signal Receiver - Probability of Error. Optimum Receiver - optima of Coherent Reception - Signal Space Representation and Probability of error – eye diagrams Cross talk.
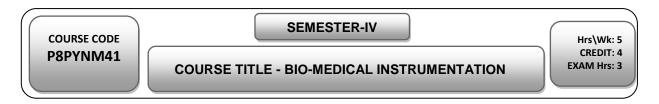
UNIT -V: Information Theory:
Information Theory: Information and entropy - conditional entropy and redundancy- Shannon Fano coding - Mutual Information - Information loss due to noise - source codings - Huffman Code - variable length coding - Source coding to Increase average information per bit.

Books for Study:

1. Principles of communication systems - Herbert Taub. Donald L Schiling, Goutam Sana, 3rd Edition, McGraw-Hill, 2008
2. Digital and Analog Communicator Systems - Sam Shanmugam, John Wiley, 2005.

Books for Reference:

1. Digital Communications - John G. Proakis, Masoud salehi – 5th Edition,
   McGraw- Hill, 2008.
2. Digital Communication - Simon Haykin, Jon Wiley, 2005.
3. Digital Communications - Ian A. Glover, Peter M. Grant, Edition,
   Pearson Edu., 2008.
4. Communication Systems-B.P. Lathi, BS Publication, 2006.

COURSE CODE P8PYNM41	SEMESTER-IV	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE - BIO-MEDICAL INSTRUMENTATION	

Objective: This paper aims at introducing the learner to understand the various Instruments used in medical field to analyse the data.

UNIT- I: Transducers and Sensors

Classification of Transducers- Principle, construction and working of Thermisters, LVDT, Electrical strain gauges and capacitive transducers – Optical fibre sensors – Photometric sensors – Physical sensors – Chemical sensors – Biosensors – Sources of biomedical signals.

UNIT- II: Digital Instrumentation

Principle, block diagram and working of Digital frequency counter, digital multimeter digital pH meter, digital conductivity meter and digital storage oscilloscope.

UNIT- III: Analytical Instrumentation

Principle, block diagram, description, working and applications of UV-VIS spectrometer, FT-IR Spectrometer – AES spectrometer – Basic concepts of Gas and Liquid Chromatography.

UNIT- IV: Bio – Medical Instrumentation

Sources of biomedical signals – Physiological transducers to measure blood pressure, body temperature - Sources of Bio – electric potentials, resting potential, action potential, bio potential electrodes - Principle, block diagram and operation of ECG and EEG Recorders.

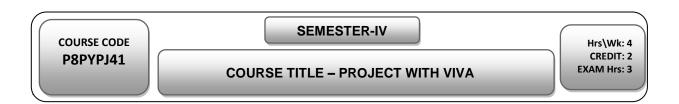### UNIT- V: X-ray machine and Digital Radiography

Basis of Diagnostic Radiology – Block diagram and operation of X-ray machine – X-ray film – fluorescent Screen – X-ray image Intensifier television System – Digital X-ray imaging system – Basic principle and operation of X-ray computed tomography.

Books for Study

1. Dr. Rajendra Prasad, Electronic Measurements and Instrumentation, Khanna Publications.
2. S. Ramabhadran, Electronic Measurements and Instrumentation Khanna Publications.
3. R S Khandpur, Hand book of Biomedical Instrumentation II nd Edition, Tata Mc Graw-Hill Publishing Company Limited, New Delhi
4. Bio medical Instrumentation by Arumugam.

Books for Reference

1. S.M .Dhir , Electronics and Instrumentation, Khanna Publisher,
2. Saifullah Khalid, Mukesh Jain, Neetu Agrawal, Basic Electronics and Instrumentation,University Science Press,Laxmi publications, New Delhi.
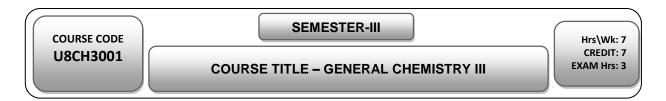
COURSE CODE P8PYPJ41	SEMESTER-IV	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3
	COURSE TITLE – PROJECT WITH VIVA	

COURSE WORK

1. Projects would be allotted to III Semester students which have to be carried out and completed in Semester IV.

2. A list of projects will be finalized and announced by the Department. The students will have an option to select the project in their field of interest.

3. The project will comprise of the following:

   a. Study of background material
   b. Collection of data, procurement and fabrication of experimental set up and
   c. Writing of computer programs if needed.
   d. Giving a preliminary seminar in the III semester for the purpose of internal assessment.
   d. Writing a dissertation or project report. This will be submitted by the students at the end of IV semester.

VIVA-VOCE

The Final evaluation of the project work completed will be done by external and internal examiners appointed by the Board on the basis of an oral presentation and the submitted Project-Report.

OBJECTIVE:

To acquire knowledge about the basic concepts regarding principles of inorganic analysis and applications of qualitative analysis, solvents, p-block elements, group study, aromaticity, electrophilic and nucleophilic substitution reactions, elimination reactions, mechanism, thermodynamics, derivation of equations, related problems and applications wherever necessary.

UNIT-I

1.1 Definitions of molarity – normality – molality and mole fraction – their calculations – definition and examples for primary and secondary standards. calculation of equivalent weights

1.2 Theories of acid-base – redox – complexometric, iodimetric and iodometric titrations. Theories of indicators – acid-base – redox – metal ion and adsorption indicators and choice of indicators.

1.3 Types of solvents – Physical properties of solvent – Protic and aprotic solvents – Amphi-protic / amphoteric solvent – aqueous and non-aqueous solvents – Liquid ammonia and Liquid SO_2 as solvent.

UNIT-II

2.1 Aromaticity – Modern theory of aromaticity – Huckel's (4n+2) π electron rule and its simple applications – Aromatic hydrocarbons – Resonance in benzene – Delocalised cloud in benzene.

2.2 Electrophilic substitution reactions in aromatic compounds – General mechanisms – nitration – halogenation – sulphonation – Friedel-Craft's acylation and alkylation.

2.3 Aliphatic nucleophilic substitutions – SN^1, SN^2 and SN^i reactions and mechanism – effects of structure of substrate – solvent – entering and Leaving groups.

UNIT-III

3.1 Second law of thermodynamics – Need for the II law – Spontaneous process – Criteria of spontaneity – different forms of statements of the second law – Cyclic process – Heat engines – Clausius inequality.

3.2 Carnot's cycle – Efficiency – Carnot's theorem (Statement only) – Concept of entropy – Definition – Randomness and entropy – Numerical definition of entropy – standard entropy physical significance of entropy

3.3 Derivation of entropy from Carnot cycle – entropy change of an ideal gas during isothermal process – Entropy changes in cyclic – reversible and irreversible processes.
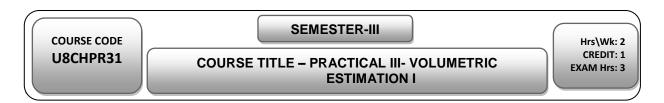
UNIT-IV

4.1 'p' block elements – Boron family – group discussion – anomalous behaviour of Boron – diagonal relationship between B and Si – Electron deficiency and electron acceptor behaviour of Boron trihalides – bonding (banana bond) in diborane.

4.2 Directive influence – Orientation – Ortho / para ratio – Nuclear and side chain Halogenations

4.3 Entropy changes in physical transformations – Calculation of entropy changes with Changes in T,V and P – entropy of mixing of ideal gases.

UNIT-V

5.1 Carbon family – Group discussion – catenation – Comparison of properties of carbon and silicon valencies – oxides – halides – hydrides and oxy acids. Classification – preparation – properties and uses of carbides.

5.2 Elimination reactions – Bimolecular elimination reaction (E2) – Unimolecular Elimination reaction (E1) – mechanisms of E1, E2 and E1CB reactions – Hoffmann and Saytzeff's – Cis and trans eliminations

5.3 Free energy and work function – Gibb's free energy – Helmholtz work function – their variations with temperature – pressure and volume – Criteria for spontaneity Maxwell's relationship.

REFERENCE:
1. Text book of Inorganic Chemistry by Puri & sharma.
2. Text book of Inorganic Chemistry by PL Sony.
3. Text book of Inorganic Chemistry by JD. Lee.
4. Text book of Organic Chemistry by PL Sony.
5. Text book of Organic Chemistry by Morison & Boyd.
6. Text book of Organic Chemistry by Bahl & Arunbahl.
7. Text book of Physical Chemistry by Puri & Sharma.
8. Text book of Physical Chemistry by PL Sony.
9. Thermo dynamics by Glasston & lewis.
10. Practical Inorganic Chemistry by Vogel.

Objective: To learn the practical techniques of Acidimetry, Iodimetry & Iodometry.

1. Estimation of Borax – Standard Sodium Carbonate.
2. Estimation of Sodium Hydroxide – Standard Sodium Carbonate.
3. Estimation of Ferrous Sulphate - Standard Potassium Permanganate.
4. Estimation of Copper – Standard Copper Sulphate.
5. Estimation of Potassium dichromate – Standard Potassium dichromate.

Students must write short procedure for the given estimation in ten minutes during the examinations and submit the paper for evaluation.

Reference Book:

1. Inorganic Quantitative Analysis by Vogel.

Marks 75

1. Short procedure   10 Marks
2. Titration 1   15 Marks
3. Titration 2   15 Marks
4. Result   20 Marks
5. Record   10 Marks
6. Viva-voce   05 Marks

Error Calculation:

< 2%	-	20 Marks
2 – 3%	-	15 Marks
3 – 4%	-	10 Marks
>4%	-	05 Marks

COURSE CODE U8PYAL31/ U8CHAL31	SEMESTER-III	Hrs\Wk: 7 CREDIT: 6 EXAM Hrs: 3
	COURSE TITLE - ALLIED MATHEMATICS I	

Objectives: To Explore the Fundamental Concept of Mathematics

UNIT– I   ALGEBRA   21 Hours

Partial Fractions – Binomial, Exponential and logarithmic Series (without Proof) – Summation and approximation.

UNIT– II   THEORY OF EQUATIONS   21 Hours

Polynomial Equations with real Coefficients –imaginary and Irrational roots – Solving equations with related roots –Formation of Equations– Equation whose roots are Symmetric functions of roots of a given equation by diminishing (or increasing) its roots by a constant – Reciprocal equations– Simple problems.

UNIT– III   MATRICES   21 Hours

Symmetric – Skew-symmetric – Orthogonal and Unitary matrices –Hermitian – Skew Hermitian – Rank of a matrix (upto order 4) – Consistency of equations – Eigen roots and eigen vectors – Cayley-Hamilton theorem (without proof) – verification – Computation of inverse matrix.

UNIT– IV   TRIGONOMETRY   21 Hours

Expansions of $\sin^n\theta$, $\cos^n\theta$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$–Expansions of $\sin\theta$, $\cos\theta$, $\tan\theta$ in terms of θ– Hyperbolic and inverse hyperbolic functions – Logarithms of complex numbers.

UNIT– V   DIFFERENTIAL CALCULUS   21 Hours

The nth derivatives – Leibnitz theorem (without proof) and applications – Jacobians – Polar coordinates – Curvature and radius of curvature in Cartesian and Polar co-ordinates.

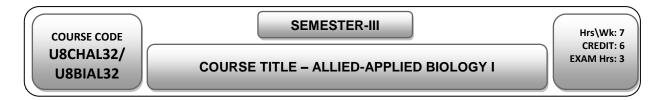**CONTENT AND TREATMENT AS IN:**
    P. Duraipandian and S. Udayabaskaran, (1997), ALLIED MATHEMATICS, Vol. I & II, Muhil Publishers, Chennai.

REFERENCES
1. *P.Balasubramanian and K.G. Subramanian,* (1997), ANCILLARY MATHEMATICS, Vol. I & II, Tata McGraw Hill, New Delhi.

2. *S.P. Rajagopalan and R. Sattanathan*, (2005),ALLIED MATHEMATICS, Vol. I & II, Vikas Publications, New Delhi.

3. *P. Kandasam and, K. Thilagavathy,* (2003), ALLIED MATHEMATICS, Vol. I & II, S.Chand& Company, New Delhi.

COURSE CODE U8CHAL32/ U8BIAL32	SEMESTER-III	Hrs\Wk: 7 CREDIT: 6 EXAM Hrs: 3
	COURSE TITLE – ALLIED-APPLIED BIOLOGY I	

Objectives: to focus on the significance and the applications of biological organisms.

Unit I: Vermiculture – Introduction – scope and importance. Types – Physicochemical characters of vermicomposting. Methods of vermicomposting, vermiwash, Applications of vermicomposting in green farming.

Unit II: Sericulture – Introduction – scope – Life cycle of silk moth. – Rearing of silk. Diseases of silk worm. – Moriculture and its applications.

Unit III: Aquaculture – Cultivable organisms (Freshwater, estuarine and marine) – Criteria to select cultivable organisms. – Culture technique of common carp. – Design, construction and maintenance of Home aquaria. – Fish products, Fish meat and Economic importance.

Unit IV: Apiculture – Life cycle of Honey bee, Mouth parts, methods and preparation of honey hives, Medicinal importance of Honey.

Unit V: Mushroom Culture – Introduction and scope – types of mushroom – methods of mushroom culture and economic importance. Diseases of mushroom and poisonous mushroom.

Reference books:

1. Biotechnology, V. Kumaresan- Saras publications, Edition-1994.

2. International Zoology, E.L. Jordan and P.S. Verma – Edition – 2010

3. Economic Zoology, Verma (1998)

4. Microbiology, A. Mani-Saras Publication (2007)

5. Textbook of Entomology, Fr. Ignatchimuthu (1978)

COURSE CODE U8PYAP31/ U8CHAP31	SEMESTER-III COURSE TITLE - ALLIED MATHEMATICAL STATISTICS PRACTICAL I	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

1. Mean
2. Median
3. Mode
4. Standard Deviation, Quartile Deviation and Coefficient of Variation.
5. Skewness and Kurtosis.

NOTE:

Use of Scientific Calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

CONTENT AND TREATMENT AS IN:

S. P. Gupta, STATISTICAL METHODS, Sultan Chand & Sons, New Delhi.

REFERENCES:

1. *R.V. Hogg and A.T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS,Macmillan.
2. *A. M. Mood, G. A. Graybiland, D.G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
3. *S. S. Wilks,*ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.
4. *S.C. Gupta and V.K.Kapoor,* FUNDAMENTAL OF APPLIED STATISTICS,Sultan & sons.

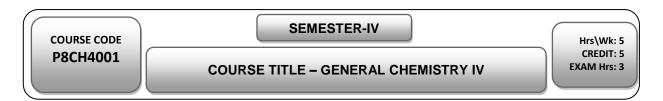| COURSE CODE **U8CHAP32/** **U8BIAP32**	**SEMESTER-III** **COURSE TITLE – ALLIED-APPLIED BIOLOGY** **PRACTICAL I**	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

Aim: To understand and explore the Specimens/Modals/Charts/Slides

1. Earthworm – Adult, Body Setae

2. Vermicomposting Methods,

3. Bombyx mori life cycle, cocoon, larva and pupa

4. Silk-Uses

5. Freshwater and Marine water fishes (Each 2)

6. Fish Tank and Aerator,

7. Placoid Scale and Fins

8. Honey bee- Mouth parts and life cycle

9. Honey Hives, Comb and Honey uses

10. Lac insect and uses

11. Mushroom – Morphology, Types and uses

12. Nutritional Value

13. Herbarium

Reference Book

1. Biotechnology, V. Kumaresan, Saras Publication, Edition – 1994

2. Invertebrate Zoology, E.L. Jordan and P.S. Verma, Edition – 2010

3. Textbook of Entomology, Fr. Ignatchimuthu (1978).

| COURSE CODE | SEMESTER-IV | Hrs\Wk: 5 |
| **P8CH4001** | **COURSE TITLE – GENERAL CHEMISTRY IV** | CREDIT: 5
 EXAM Hrs: 3 |

OBJECTIVE:
To enhance knowledge on p-block elements & group study, aromatic nucleophilic substitution reactions, polyhydric alcohol, unsaturated alcohols, phenols, preparation properties, important name reactions, mechanism, thermodynamics, derivation of equations, partial molar properties, chemical potential, related problems, applications.

UNIT-I

1.1 'p' block elements – Nitrogen family – Comparative study of N,P,As,Sb and Bi – elements – oxides – oxyacids – halides and hydrides – valency states.

1.2 Oxygen family – Comparative study of O, S, Se and Te-elements-catenation – Oxides – halides – hydrides and oxy acids – anomalous behaviour of oxygen.

1.3 Oxy-acids of sulphur including Peroxy acids and Thionic acids.

UNIT-II

2.1 Aromatic nucleophilic substitutions – Unimolecular nucleophilic substitution – mechanism – Bimolecular nucleophilic substitution – mechanism.

2.2 Polyhydric alcohols – Unsaturated alcohols – Preparation, Properties and uses of Glycerol and allyl alcohol.

2.3 Phenols – acidic character of phenols – Kolbe's reaction, Reimer – Tiemann reaction, Gattermann, Lederer, Manasse and Houben – Hoesh reactions.

UNIT-III

3.1 Gibbs-Helmholtz equations – derivation and applications.Clausius - Clapeyron Derivation and Application.

3.2 Third law of thermodynamics – Entropy at absolute zero – Planck's formulation of third law – Nernst heat theorem – statement of III law of thermodynamics.

3.3 Evaluation of absolute entropy from heat capacity measurement - exceptions to III law – applications of III law.
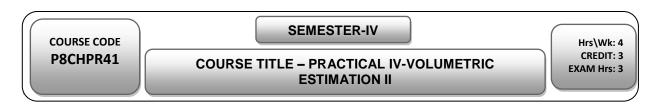
UNIT-IV

4.1 Noble gases – Electronic configurations – Reasons for placing in zero group –position in the periodic table – Chemical inertness reasons and its applications – Clathrate Compounds.

4.2 Di and tri-hydric phenols - alpha and beta naphthols – preparation, properties and uses.

4.3 Partial molar properties – Chemical potential – Gibbs-Duhem equation effect of temperature and pressure – chemical potential in systems of ideal gases.

UNIT-V

5.1 Compounds of Xenon – hybridization and geometries of XeF_2 – XeF_4-XeF_6- $XeOF_4$.

5.2 Ring substitution in phenol – nitration - Sulphonation – halogenation – coupling with diazonium salts.

5.3 Mechanisms of etherification - chemical potential of solvent in Binary ideal liquid solutions – Duhem –Margules equation and Applications

REFERENCE:

1. Text book of Inorganic Chemistry by Puri, Sharma & Pathania.
2. Text book of Inorganic Chemistry by PL Soni.
3. Text book of Inorganic Chemistry by JD.Lee.
4. Text book of Organic Chemistry by PL Soni.
5. Text book of Organic Chemistry by Morison & Boyd.
6. Text book of Organic Chemistry by Bahl & Arunbahl.
7. Text book of Physical Chemistry by Puri & Sharma.
8. Text book of Physical Chemistry by PL Soni.
9. Thermodynamics by Glasston & lewis.

Objective: To learn the practical techniques of Complexometry, Dichrometry & Precipitation Titrations.

COMPLEXOMETRY:

1. Estimation of Magnesium using EDTA.
2. Estimation Zinc using EDTA.
3. Estimation of Nickel using EDTA.
4. Estimation of Calcium using EDTA.
5. Determination of total hardness.

DICHROMETRY

6. Estimation of ferrous iron using Diphenyl amine /N-Phenylanthranillic acid as indicator.

PRECIPITATION TITRATION

7. Estimation of Chloride in neutral medium. [Demonstration – Experiment].

Students must write short procedure for the given estimation in ten minutes during the examinations and submit the paper for evaluation.

Reference Book:

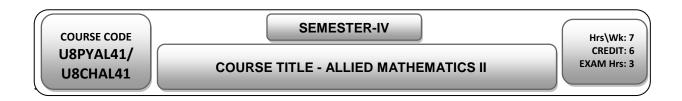1. Inorganic Quantitative Analysis by Vogel.

Marks 75

1. Short procedure   10 Marks
2. Titration 1   15 Marks
3. Titration 2   15 Marks
4. Result   20 Marks
5. Record   10 Marks
6. Viva-voce   05 Marks

Error Calculation:

< 2%	-	20 Marks
2 – 3%	-	15 Marks
3 – 4%	-	10 Marks
>4%	-	05 Marks

Objectives: To Explore the Fundamental Concept of Mathematics

UNIT– I   INTEGRAL CALCULUS   21 Hours

Properties of definite integrals – Integration by parts – Reduction formulae $\left(\int \sin^n x \, dx, \int \cos^n x \, dx \ \text{only} \right)$ –Simple Problems.

UNIT– II   PARTIAL DIFFERENTIAL EQUATIONS   21 Hours

Formation – Complete integrals and general integrals – Four standard types, Lagrange's equation.

UNIT– III   LAPLACE TRANSFORMS   21 Hours

Laplace Transformations of standard functions and simple properties – Inverse Laplace transforms – Simple problems.

UNIT– IV   VECTOR ANALYSIS   21 Hours

Scalar point functions – Vector point functions – Gradient, divergence and curl – Directional derivatives –Line, Surface and Volume integrals – Guass, Stoke's and Green's theorems (Statement only).

UNIT– V   FINITE DIFFERENCES AND OPERATORS   21 Hours
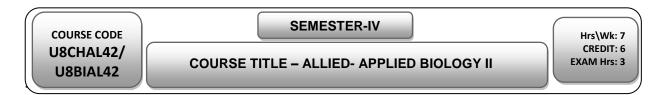
First and Higher order differences – Forward and Backward difference – Properties of operators – Difference of a polynomial – Factorial polynomials – Operator E–Relation between Δ , ∇ and E.

CONTENT AND TREATMENT AS IN:
P. Duraipandian and S. Udayabaskaran, (1997), ALLIED MATHEMATICS, Vol. I & II, Muhil Publishers, Chennai. *B.D. Gupta*, (2001), NUMERICAL ANALYSIS, Konark Pub. Ltd., Delhi.

REFERENCES

4. *P.Balasubramanian and K.G. Subramanian,* (1997), ANCILLARY MATHEMATICS, Vol. I & II, Tata McGraw Hill, New Delhi.
5. *S.P. Rajagopalan and R. Sattanathan*, (2005), ALLIED MATHEMATICS, Vol. I & II, Vikas Publications, New Delhi.
6. *P. Kandasamy and K. Thilagavathy,* (2003), ALLIED MATHEMATICS, Vol. I & II, S. Chand & Company, New Delhi.

COURSE CODE U8CHAL42/ U8BIAL42	SEMESTER-IV	Hrs\Wk: 7 CREDIT: 6 EXAM Hrs: 3
	COURSE TITLE – ALLIED- APPLIED BIOLOGY II	

Objectives: to focus on economic importance and the applications of biological organisms.

Unit I : Biofertilizer – Agricultural benefits, Soil fertility, Nitrogen fixation and its importance - use of microbes – Azolla and Rhizobium – Azotobacter – Azospirillum and Blue Green Alage and Mass production of Biofertilizer and its applications.

Unit II: Herbal Technology – Medicinal plants in Cardiovascular, Lungs, Brain, Skin and Liver disorders (Each two). Flavonoids, Antioxidants and Phytochemical properties of Medicinal plants.

Unit III: Industrial Biotechnology – Microbes involved in Fermentation – Ethanol Fermentation and its Applications. Production of Antibiotics, Vaccines and Hormones. Monoclonal Antibodies – Hybridoma Technology and Applications.

Unit IV: Food Technology – Common food – Microorganisms of food – Microbial Examination of food – Food spoilage of Meat, Fish, Milk, Vegetables. Dairy Products – Fermented milk, Butter milk, Ghee, Cheese.

Unit V: Environmental Biotechnology – Global Environmental issues and Biotechnological solution. Treatment of industrial waste – Bio remediation technique. Bioremediation technique. Air, Soil pollution and its control.

Reference books:

1. Text book of Biofertilizer (2000)
2. Economic Zoology, Verma (1998)
3. A textbook of Practical Zoology-Invertebrate, S.S. Lal (1990)
4. Ecology, N.T. Krishnan – J.J. Publications (1992)
5. Microbiology, A. Mani-Saras Publication (2007)

6. A textbook of Biotechnology, R.C. Dubey (2007)

7. Textbook of Entomology, Fr. Ignatchimuthu (1978)

8. Natural Products in medicine: A Biosynthetic approach (1997), Wiley

9. Cultivation and Processing of Medicinal Plants, U.K. Chichister, Wiley & Sons.

1. Coefficient of correlation, Rank correlation.
2. Multiple Correlations.
3. Partial Correlation.
4. Regression equations.
5. χ^2 test of Independence of attributes (2×2 contingency table only).

NOTE:

Use of Scientific Calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

CONTENT AND TREATMENT AS IN:

S. P. Gupta, STATISTICAL METHODS, Sultan Chand & Sons, New Delhi.

REFERENCES:

5. *R.V. Hogg and A.T. Craig,* (1998), INTRODUCTION TO MATHEMATICAL STATISTICS,Macmillan.
6. *A. M. Mood, G. A. Graybiland, D.G. Boes,* (1974), INTRODUCTION TO THEORY OF STATISTICS, McGraw Hill.
7. *S. S. Wilks,*ELEMENTARY STATISTICAL ANALYSIS, Oxford and IBH.
8. *S.C. Gupta and V.K.Kapoor,*FUNDAMENTAL OF APPLIED STATISTICS,Sultan & sons.

1. Identification of Spotters, Slides, Modals of

   a. Nitrogen Fixing Bacteria

   b. Agrobacterium,

   c. Rhizobium,

   d. Azospiriilum,

   e. Azolla,

   f. Blue Green Algae,

   g. Spirulina.

2. Medicinal plant identification for Heart, Kidney, Lung, Brain and Liver diseases.

3. Identification of Spotters/Instruments

   a. Fermenter

   b. Hybridoma Technology

   c. Recombinant Insulin – Humulin

   d. Sphygmomanometer

   e. Blood group typing

4. Ecological Adaptations of Fish, Amphibian, Reptiles, Birds and Mammals.

5. Barometer, Hygrometer and Refractometer.

Reference books:

1. Text book of Biofertilizer (2000)

2. Economic Zoology, Verma (1998)

3. A textbook of Practical Zoology-Invertebrate, S.S. Lal (1990)

4. Ecology, N.T. Krishnan – J.J. Publications (1992)

5. Microbiology, A. Mani-Saras Publication (2007)

6. A textbook of Biotechnology, R.C. Dubey (2007)

7. Natural Products in medicine: A Biosynthetic approach (1997), Wiley

8. Cultivation and Processing of Medicinal Plants, U.K. Chichister, Wiley & Sons.

OBJECTIVES:
To apprise the students about the latest trend in Theoretical chemistry and make them computer literate with expertise in subjects such as quantum chemistry and also make them learn about the organometallics which are highly used as catalysts in the industry.

UNIT I - ORGANOMETALLIC CHEMISTRY I

Synthesis, structure and bonding: Anionic sigma donors – alkyls and aryls; neutral sigma donors – carbonyls and nitrosyls; chain pi donors – olefins, acetylenes and allyls; cyclic pi donors – metallocenes. Reactions: Association – ligand protonation; Substitution – electrophilic and nucleophilic attack on ligands; Addition and elimination – carbonylation and decarbonylation; Rearrangements – oxidative addition and reductive elimination – Fluxinol isomerism

UNIT II - ORGANOMETALLIC CHEMISTRY II

Catalysis: Hydrogenation of olefins [Wilkinson`s catalyst], hydroformylation of olefins using cobalt and Rhodium catalysts [Oxo process], oxidation of olefins to aldehydes and ketones [Wacker`s process] Polymerization of olefins [Zeigler-Natta catalyst], cyclooligomerisation of olefins and acetylenes [Reppe`s and Wilke`s catalyst], polymer bound catalysts.

UNIT III - PHOTOCHEMISTRY AND OCTAHEDRAL COMPLEXES

Inorganic Photochemistry: Photosubstitution, Photoredox and isomerization process, application of metal complexes in solar energy conversions. Substitution of Octahedral complexes of Cobalt and Chromium, replacement of coordinated water, solvolysis (acids and bases) reaction applications in synthesis. Solar energy: Panels used in them and the developments.

UNIT IV - COMPUTATIONAL CHEMISTRY –I

Basics about Computers: Hardware and Software definitions. Languages – Higher level and lower level. Basics of Internet: DNS, ISP, DSL, http, www, URL, LAN and WAN, Repeater, Modem. Open Source software resources on web. Workstation and Cloud computing.

Fundamentals of Computational Chemistry: Semi-empirical and Ab-initio methods, Molecular Mechanics and Density Functional Theory (Basic Definitions) and Examples of Software related to these such as MOPAC and Gaussian (Or GAMESS). Visualization of results, properties predictable and Significance with few examples.

Drawing of structure using free softwares (Chemdraw, Chemsketch, Molden and Facio - scope), saving and reading formats and conversions (OpenBabel). Construction of z matrix of some simple molecules such as water, formaldehyde, methane and ethane.
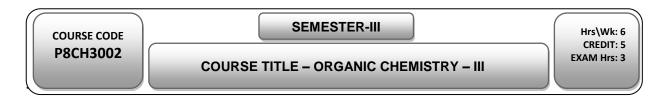
UNIT V - COMPUTATIONAL CHEMISTRY –II

Quantitative Structure Activity Relationship –Significance with Hammet-Taft equation. Elucidation with an example using Molecular Descriptors like Log P, Polarizability, Dipole moment, Surface Area, MESP, HOMO, LUMO, Mulliken and Lowden Charges. Ramachandran Plot- Torsional Angles, Phi & Psi and their significance.

Drug Designing basics – Modeling a drug and predicting mechanism of action of drug – Docking concept (basics) and its significance, Lipinski Rule. Online drug-likeness portal using 'Molinspiration'.

Predicting Molecular Geometry, conformers and optimization. Input formats (Basic) to include, Cartesian coordinates and unique coordinates, Smiles, mol, pdb and gjf. Quantum Chemical Descriptors, Fukui Function, Calculation of Chemical Potential, Electron Affinity, Hardness and Softness, and other properties (using FMO Approach).

Text books and References:

1. Computational Chemistry – A practical guide for applying techniques to real world problems – David Young, Wiley Interscience, ISBN-0-471-33368-9.
2. Essentials of Computational Chemistry, Theories and Models – Christopher J Cramer, Wiley, ISBN: 0-470-09182-7.
3. Computational Chemistry – Introduction to the Theory and Applications of Molecular and Quantum Mechanics, Springer, ISBN: 978-81-8128-476-1.
4. Computational Organic Chemistry, Steven M Bachrach, Wiley Interscience, ISBN: 978-0-471-71342-5.
5. Inorganic Chemistry, Gary Wulfsberg, Viva books pvt. Ltd. ISBN: 81-7649-288-4.
6. Molecular Modelling – Principles and Applications, Andrew R Leach, Pearson Education Ltd. ISBN:978-0-582-38210-7.
7. Bio-informatics, S C Rastogi, N Mendiratta and P Rastogi, Prentice Hall India, ISBN:978-81-203-3595-0.
8. Computational Medicinal Chemistry for Drug Discovery, Edited by P Bultinck, H De Winter, W langenaeker and J P Tollenaere, Marcell Dekker, ISBN: 0-8247-4774-7.
9. Physical Chemistry- A molecular Approach, Donald A MQuarrie and John D Simon, Viva books pvt ltd. ISBN: 81-7649-001-6.
10. Computers in Chemistry, AV Raman,Tata McGraw Hill, ISBN: 0-07-460123-7.

OBJECTIVE:
To understand the concepts of spectral techniques and to apply these techniques for the quantitative and structural analysis of organic compounds. To learn Alkaloids, Steroids, Hetrocyclic compounds, Aromaticity, photochemical reactions and their importance.

UNIT I – UV, IR AND NMR SPECTROSCOPY

UV – Visible spectroscopy – types of electronic transitions – chromophores and auxochromes – factors influencing positions and intensity of absorption bands – absorption spectra of dienes, polyenes and α, β - unsaturated carbonyl compounds – Woodward – Fischer rules.

IR Spectroscopy – vibrational frequencies and factors affecting them – identification of functional groups – intra and inter molecular hydrogen bonding – finger print region.

Nuclear spin- magnetic moment of a nucleus – nuclear energy levels in the presence of magnetic field– basic principles of NMR Spectroscopy – CW and FT NMR – ^{1}H NMR – chemical shift and coupling constant – factors influencing proton chemical shift and vicinal proton – proton coupling constant – ^{1}H NMR spectra of simple organic molecules AX and AMX spin system – spin decoupling – nuclear over Hauser effect- chemical exchange.
^{13}C NMR – proton decoupled and off – resonance ^{13}C NMR spectra – factors affecting ^{13}C chemical shift – ^{13}C NMR spectra of simple organic molecules.

UNIT II - PHYSICAL METHODS OF STRUCTURAL DETERMINATION

Mass Spectrometry – Principles – measurement techniques – (EI, CI) – presentation of spectral data – molecular ions – isotope ions – fragment ions of odd and even electron types – rearrangement of molecular ions factors affecting cleavage pattern – simple and multicenter fragmentation – McLafferty rearrangement. Mass spectra of hydrocarbons, alcohols, phenols, aldehydes and ketones. CD and ORD- Octant rule, cotton effect, axial halo ketone rule, and its applications.
Problems solving using all spectral data (limited to 10 carbon atoms).

UNIT III – ALKALOIDS AND STEROIDS

Total synthesis of quinine, morphine, reserpine and cocaine.

Synthesis of cholesterol, ergosterol, oestrone, carotenes, conversion of cholesterol to progesterone, Oestrone and testosterone. Structural elucidation of cholesterol.

UNIT IV – PROTEINS, VITAMINS AND TERPENES.

PROTEINS: Peptides and their synthesis - synthesis of tripeptide. Merrifield synthesis, Determination of tertiary structure of proteins.
VITAMINS: Synthesis of vitamin A1 (Reformatsky and Wittig reaction methods only).

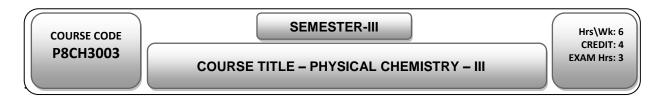TERPENES: Introduction, classification, isoprene rule, structural determination of geraniol, α-pinene and camphor.

UNIT V –ORGANIC PHOTOCHEMISTRY AND AROMATICITY

Photochemical excitation – fate of the excited molecules – Jablonski diagram – study of photochemical reactions of ketone – Photoreduction – photocyclo addition – Paterno – Buchi reaction – Divinylcyclopropane rearrangement – Pericyclic reactions – classification – orbital symmetry – Woodward Hoffman rules – Analysis of electrocyclic, cyclo addition and sigmatropic reactions – correlation diagrams for 1,3 butadiene – cyclobutene system - inter conversion of 1,3,5 hexatrienes to cyclohexadienes,Structure of bulvalene, a fluxional molecule – Cope and Claisen rearrangement.

Aromaticity of benzenoid, heterocyclic, and non-benzenoid compounds, Huckel's rule – Aromatic systems with pi electron numbers other than six – non-aromatic (cyclooctatetraene etc.,) and anti-aromatic system (cyclobutadiene etc.) – system with more than 10π electrons – Annulenes C_{12}-C_{18} (synthesis of all these compounds is not expected).

RECOMMENDED BOOKS

1. Application of absorption spectroscopy of organic compounds by J. Dyer, Prentice – Hall of India, Pvt., New Delhi.,
2. Spectrometric identification of organic compounds by R.M. Silverstein, G.d. Bassler and Monsu. John Wiley and Sons, New York.
3. Introduction to the spectroscopic methods for the identification organic compounds – 2 volumes, Schiemann Pergamman Press.
4. Organic Chemistry, Vol. II, I.L. Finar, 5th edition ELBS publication.
5. Spectroscopy of Organic compounds by P.S. Kalsi, Wiley Eastern Ltd., Chennai.
6. Molecular reaction and photochemistry by Charles H.Depuy and Orville, L. Chapmann, Prentice Hall of India Pvt., Ltd., New Delhi.
7. Advanced organic chemistry III Edition by J. March.
8. Advanced organic Chemistry by Francis A. Carey and Richard J. Sundberg, 3rd Edition (1990).
9. Physical organic chemistry by Neil S. Issac, ELBS publication 1987.
10. Organic reaction mechanism, Macmillan India, 1999.
11. Chemistry of organic natural products by Agarwal, Geol Publishing House.
12. Spectroscopy W. Kemp, Macmillan Ltd.,
13. Structural identification of organic compounds Y.R. Sharma, S. Chand & Co.
14. Chemistry of Organic Natural products Vol. 1 & 2 by OP Agarwal.
15. Organic Reaction & Mechanism by OP Agarwal.

OBJECTIVE:
To study the application of Quantum Chemistry to chemical bonding. To study the ionic conductance, Electrode – Electrolytic interface. To study the kinetics of polymerization and to study NMR spectroscopy and its applications.

UNIT I – QUANTUM CHEMISTRY

Approximation methods – perturbation and variation methods – application of variation method to H_2 atom and application of perturbation method to Helium atom – term symbols for atoms in the ground state.

Born – Oppenheimer approximation – Slater deteriminental wave functions - Valence bond theory for hydrogen molecule – LCAO – MO theory for di- and polyatomic molecules. Concept of hybridization – Huckel theory for conjugated molecules (Ethylene, butadiene and benzene) – semi – empirical methods – Slater orbital and HF – SCF methods.

UNIT II – ELECTROCHEMISTRY - I

Mean ionic activity and mean ionic activity coefficient – concept of ionic strength, Debye – Huckel theory of strong electrolytes – activity coefficient of strong electrolytes – determination of activity coefficient by electrochemical method. Debye Huckel limiting law – qualitative and quantitative verification – limitations – Huckel equation – Debye – Huckel – Onsagar equation.

UNIT III – ELECTROCHEMISTRY- II

Electrode – electrolyte interface – adsorption at electrical interface – electrical double layer – electro capillary phenomenon – Lippmann equation – Structure of double layers – Helmholtz – Perrin, Guoy –Chappmann and Stern model of electrical double layers – Zeta potential and its applications.

Diffusion – Fick's law of diffusion – Effect of ionic association on conductance-electrokinetic phenomena-membrane potential.

UNIT IV – MACROMOLECULES

Kinetics of free radical polymerization - Mechanism - Chain Initiation- Propagation – Termination-Transfer –Inhibition and Retardation. Kinetics of co-polymerisation, Determination of Molecular weight of polymers - Osmometry, Viscometry, Ultracentrifuge. Co-ordination polymerisation – Ziegler natta catalysis.
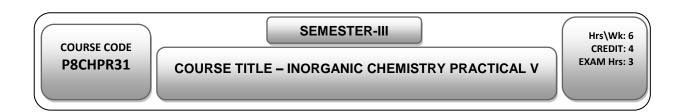
UNIT V – SPECTROSCOPY - II

Resonance spectroscopy – Zeeman effect – equation of motion of spin in magnetic fields – chemical shift – spin spin coupling - NMR of simple AX and AMX type molecules – calculation of coupling constants – ^{13}C, ^{19}F, ^{31}P NMR spectra – applications – a brief discussion of Fourier transformation resonance spectroscopy.

Text Books

1. R.K. Prasad, Quantum Chemistry, WileyEastern,New Delhi,1992.
2. M.W. Hanna, Quantum Mechanics In Chemistry,W.A. Benjamin Inc.London,1965.
3. S. Glasstone, Introduction To Electrochemistry, Affiliated East West Press, New Delhi, 1960.
4. D.R. Crow, Principles And Applications To Electrochemistry, Chapman And Hall,1991.
5. J. Rajaram And J.C. Kuriacose, Thermodynamics For Students Of Chemistry, LalNagin Chand, New Delhi,1986.
6. F.W. Billmeyar, Text Book Of Polymer Science, Wiley Interscience, 1984.
7. A.Rudin, The Elements Of Polymer Science And Engineering, An Introductory Text For Engineers And Chemists, Academic Press, New York, 1973.
8. G.Odian Principles Of Polymerization, McGraw Hill Book Company, New York,1973.
9. Caringtion and Ad. Mclachlan, Introduction To Magnetic Resonance Harper And Row, New York,1967.

Suggested Reference For Books

1. R.L.De Koch And H.B.Gray,Chemical Structure and Bonding,Benjamin/Cumming,MenloPark,California.
2. A.K.Chandra,Introductory Quantum Chemistry,TataMcgraw Hill.
3. J.M.Murrell,S.F.A.Kettle and J.M.Tedder,The Chemical Bond,Wiley,1985.
4. D.A.McQuarrie,QuantumChemistry,University Science Books, Mill Valley,California,1983.
5. P.W.Atkins,Molecular Quantum Mechanics,Oxford University Press,Oxford,1983.
6. J.O.M.Bokris and A. K. N Reddy,Electrochemistry,Vols 1and 2 Plenum,New York,1977.
7. P.Dalahay,Electrode Kinetics And Structure Of Double Layer,InterScience,New York,1965.
8. J.Robbins,Ions In Solution-An Introduction In Electrochemistry,Clarendon Press,Oxford,1993.
9. H.Reiger,Electrochemistry,Chapman And Hall,New York,1994.
10. I.C.E.H.Brawn,The Chemistry Of High Polymers,Butterworth And Co.,London,1948.
11. E.A.Coolins,J.Bares And E.W.Billmeyer,Experiments In Polymer Science,WileyInterscience,New York,1973.
12. G.S.Krishenbaum,Polymer Science Study Guide,Gordon Breach Science Publishing,New York,1973.

OBJECTIVE

    i)   To gain the practical skill in inorganic estimations.
    ii)   To learn the preparation methods in inorganic Chemistry

I - QUANTITATIVE ANALYSIS

1. Estimation of Copper volumetrically and Nickel gravimetrically.
2. Estimation of Copper volumetrically and Zinc gravimetrically.
3. Estimation of Ferric ion volumetrically and Magnesium ion Gravimetrically.
4. Estimation of Ferric ion volumetrically and Nickel ion Gravimetrically.

II - PREPARATIONS

1) Tetrammine copper (II) sulphate
2) Potassium tetrachlorocuprate(II)
3) Tris (ethylenediammine) Cobalt (III) chloride
4) Hexammine Cobalt (III) chloride

SCHEME

EXPERIMENT	40 Marks
PREPARATION	15 Marks
RECORD	10 Marks
VIVA VOCE	10 Marks
Total	75 Marks

RECOMMENDED BOOKS

1. Vogel's Text book of Quantitative Inorganic Analysis.

List of Experiments

1. Determination of strength of an unknown strong acid by using a standard base.
2. Determination of strength of the individual concentrations of the two acids in the mixture (Strong and weak) by using a standard strong base.
3. Determination of strength of an unknown weak acid by using a standard base.
4. Analysis of an unknown KI using a standard silver nitrate by precipitation method.
5. Determination of strength of KCl by using a standard silver nitrate solution by precipitation method.
6. Analysis of a mixture of KCl and KI (individual concentrations) by using standard silver nitrate solution.
7. Determination of strength of barium chloride by using a standard magnesium sulphate by precipitation method.
8. Determination of strength of barium hydroxide by using a standard magnesium sulphate by double precipitation method.
9. Verification of Ostwald's dilution law using not less than five different dilute solutions of weak acid and determination of dissociation constant of weak acid.
10. Determination of Equivalent conductance ($\lambda\alpha$) at infinite dilution of strong electrolyte using five different dilutions using Debye –Huckel Onsager's equation.
11. Determination of solubility of a sparingly soluble salt by conductance method.

SPECTROSCOPY:

Interpretation of simple IR and Raman spectra of simple molecules for the

calculation of molecular data and identification of functional groups.

ORGANIC ESTIMATIONS:

ESTIMATIONS:
1. Estimation of Aniline
2. Estimation of Phenol
3. Estimation of Glucose
4. Estimation of Amino group
5. Estimation of Amide group
6. Saponification of fat or an oil
7. Iodine value of an oil
8. Estimation of sulphur in an organic compound
9. Estimation of Ethyl Methyl Ketone

External marks distribution

Spectra (5+5)	=	10
Practical	=	30
Procedure	=	05
Record	=	10
Viva-voce	=	10
Result	=	10

	SEMESTER-III	
COURSE CODE **P8CHEP32**	**COURSE TITLE –INDUSTRIAL CHEMISTRY PRACTICALS**	**Hrs\Wk: 6** **CREDIT: 4** **EXAM Hrs: 3**

OBJECTIVES:-

To compare the experimental and standard values of certain commercial substances. To check the purity of same samples.

1. Estimation of total hardness of water using EDTA.
2. Determination of Iodine value of an oil by Hanus method.
3. Estimation of Ascorbic acid (Vitamin C).
4. Determination of saponification value of an oil.
5. Determination of percentage purify of washing soda.
6. Estimation of available chlorine in bleaching powder.
7. Determination of percentage of calcium in lime stone.
8. Determination of acid value of an edible oil.

SCHEME

EXPERIMENT	55 Marks
RECORD	10 Marks
VIVA VOCE	10 Marks
Total	75 Marks

TEXT BOOKS AND REFERENCES:

1. Venkateswaran V., Veeraswamy R., Kulandivelu A.R. Basic principles of practical chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons (1997).

OBJECTIVES

To make the students learn about the applications of Spectroscopy of Inorganic compounds that are now a days used for characterization of materials and compounds. This unit also would make them learn about the latest subjects such as nanoscience.

UNIT I - UV VISIBLE AND X-RAY SPECTROSCOPY

Applications to Inorganic systems of the following: ultra violet, visible. Term symbols, energies of atomic and Molecular transitions, Selection rule, Morse potential energy diagram, Charge transfer spectra, Photoelectron spectroscopy [UV and X ray]-Koopmann`s theorem, fine structure in PES, chemical shift and correlation with electronic charges, Auger Effect.

UNIT II - IR AND RAMAN SPECTROSCOPY

Infra red and Raman spectra: Selection Rules, Use of Symmetry considerations (point group) to determine the number of lines in IR and Raman Spectra. Applications to metal complexes, Organometallic compounds, Metal carbonyls and simple inorganic compounds with special reference to coordination site, isomerism. Metal-Ligand stretching vibrations for metal carbonyls, sulphates, cyanides, isocyanides nitro and nitrito complexes

UNIT III - NMR, NQR, MOSSBAUER AND ESR SPECTROSCOPY

NMR, NQR and Mossbauer spectra – NMR of P^{31}, F^{19}, N^{15}; shift reagents, NQR – principle and applications; Mossbauer spectra – principles and applications to Iron and Tin systems.
ESR – Introduction- Zeeman equation, g-value, nuclear hyperfine splitting, interpretation of the spectrum, simple carbon centered free radicals. Anisotropy – McConnel`s equation. Kramer`s theorem, ESR of transition metal complexes of Copper, Manganese and Vanadium complex.

UNIT IV - LANTHANIDES AND ACTINIDES – NANOTECHNOLOGY

The chemistry of Lanthanides and Actinides- oxidation states, spectral and magnetic characteristics, coordination numbers, stereochemistry, nuclear and non-nuclear applications. Role of lanthanides and actinides in nuclear chemistry. Nanotechnology - Introduction, preparatory methods, characterization, application as sensors, biomedical applications, application in Optoelectronics.

UNIT V
BIOINORGANIC CHEMISTRY

Biological importance of Iron, Magnesium, Zinc, Cobalt, Copper, Sodium, Potassium and Calcium.Iron; Heme and non-heme proteins – Haemoglobin, myoglobin, iron-sulphur proteins, catalase and peroxidase, transport mechanism. Magnesium: chlorophyll, salient features of photosynthesis. Zinc: metalloenzymes – Carbonic anhydrase and carboxypeptidase. Cobalt: Cobalamines, coenzymatic actions; Copper proteins; biological functions of Na, K and Ca. Nitrogen fixation – Nitrogen cycle.

TEXT BOOKS AND REFERENCES:

1. F.A. Cotton and G. Wilkinson - Advanced Inorganic Chemistry, John Wiley and Sons (1988) V Edition.
2. K.F. Purcell and J.C. Kotz - Inorganic Chemistry, WB Saunders Co., 1977.
3. R. Drago - Physical methods in inorganic Chemistry, Reeindhod, NY, 1968.
4. C.N.R. Rao, I.R. Fellalo - Spectroscopy in Inorganic Chemistry, Vol. I and Vol. II, Academic Press, 1970.
5. K. Burger - Coordination Chemistry, Experimental methods, Butterworths, 1973.
6. G. Aruldhas - Molecular Structure and Spectroscopy - Prantice Hall.
7. N. Greenwood and A. Earnshaw - Chemistry of Elements pergamon, NY, 1984.4.
8. G.T. Seaborg, J. J. Katz - The Chemistry of Acitinide Elements, Metheun, 1957.
9. G.T. Seaborg - Transuranium elements, Dowden Hitchinson and Ross, 1978.
10. K. Hussain Reddy - Bioinorganic Chemistry, , New Age International Publishers, Delhi , 1978.
11. ManasiKarkare - Nanotechnology, Fundamentals and Applications, I.K international,Royal Society of Chemistry, 2nd edition, 2005.
12. Geoffry.AOzin, Andre C Arsenault- Nanochemistry, A chemical approach a nano materials,2005.
13. Stephen. J. Lippard, Jeremy. M. Berg – Principles of BioInorganic Chemistry, University Science books, 2008.
14. S.F.A. Kettle - Spectral interpretation
15. T. Pradeep - NANO - The essentials: Understanding nanoscience and nanotechnology

OBJECTIVE:
To know modern synthetic methods and synthetic strategies. This help in planning the synthesis of any types of organic compounds.
To learn the importance of proteins, vitamins and free radicals

UNIT I – MODERN SYNTHETIC METHODS, REACTIONS AND REAGENTS

Principles and synthetic processes involving phase transfer catalysis, (nitriles from alkyl halides, alcohol from alkyl halides) polymer supported reagents (synthesis of oligo-saccharides), micro wave assisted reaction, esterification, deacetylation and hydrolysis.

Synthesis of simple organic molecules using standard reactions like acetylation alkylation of enamines and active methylene compounds, Grignard reactions, Phosphorus and sulphur ylides Robinson annulation, Diels Alder reactions, protection and deprotection of functional groups (R-OH, R-CHO, RCO-R, R-NH$_2$ and R-COOH).

Uses of the following reagents: DCC, Trimethylsilyl iodide, 1,3-Dithiane (umpolung), diisobutylaluminimumhydride (DIBAL), 9BBN, Trimethylsilylchloride.

UNIT II –RETROSYNTHETIC ANALYSIS

An introduction to retrosynthesis – Synthon, Synthetic equivalent, Target molecule, Functional group interconversion – Disconnection approach – One group disconnection – Disconnection of alcohols, olefins and ketones – Logical and illogical disconnections, Two group disconnection – 1,2 – 1,3 – 1,4 – 1,5 – and 1,6 – deoxygenated skeletons and dicarbonyls. Retro Diels Alder reaction – pericyclic reactions – Retrosynthesis of some heterocycles containing nitrogen atoms. (not exceeding two nitrogen atoms as examples)

UNIT III - SYNTHESIS OF ORGANIC COMPOUNDS

Synthesis of longifolene, cubane, 5-hexenoic acid, trans-9-methyl-1- decalone, bicyclo[4:1:0] – hept-2-one and α-onocerin.

UNIT IV - HETERO CYCLIC COMPOUNDS

Synthesis and reactions of imidazole, oxazole, thiazole, flavones, isoflavones, anthocyanins, pyrimidines (cytocine, thymine and uracil only) and purines (adenine, guanine only).

UNIT V – FREE RADICALS

Long and short-lived free radicals, methods of generation of free radicals. Addition of free radicals to olefinic double bonds. Aromatic radical substitutions - decomposition of diazocompounds, phenol - coupling - Sandmeyer reaction Gomberg reaction, Pschorr reation, Ulmann reaction, mechanism of Hunsdiecker reaction.

RECOMMENDED BOOKS

1. Guide book to Organic synthesis by Ramond K. Mackie and David M. Smith, ELBS Publication.
2. Organic Chemistry V Edition, 1986, VolII by I.L. Finar, ELBS Publication
3. Outlines of Biochemistry V Edition by Eric E. Conn, Paul. R. Stumpf, George Bruening and Roy H. Dole, John Wiley and Sons.
4. Principles of Biochemistry General aspects by L. Smith, Robert L. Hill I. Robert Lehman, Robert J. Let Rowitz, Philip Handlar and Abrahim white. McGraw Hill Int. (7th Edition)
5. Biochemistry by LubertStryer, WH. Freeman and Co., New York
6. Introduction to Chemistry of heterocyclic compounds by R.M. Acheson, Interscience Publishers.
7. Principles of Modern heterocyclic chemistry by L.A. Pacquette, Benjamin Cummings Publishing Co., London 1978.
8. Organic synthesis by R.E. Ireland, Prentice Hall of India, Geol Publishing House.
9. Principles of Organic synthesis by R.O.C. Norman, Champan and Hall, NY, 1980.
10. Advanced Organic Chemistry by Francis. A. Carey Richard J. Sundberg, 3rd Edition, Plenum, Press, New York, 1990.
11. Advanced Organic Chemistry by Jerry March, IV edition Wiley Eastern Ltd., New Delhi.
12. Organic Chemistry, 6th Edition, 1992. RT.Morrison, R.S. Boy, Prentice Hall of India Pvt. Ltd., New Delhi.
13. Organic synthesis by Michael Smith
14. Organic Chemistry by House.
15. Micheal B. Smith, Organic Syntheis, McGraw Hill, International Editor, 1994.
16. Stuart Warren, Work book for organic synthesis, The Disconnection Approach John Wiley & Sons (Asia) Pvt. Ltd.,
17. W. Carruther, Jain Coldham, Modern Methods of organic synthesis, 4th Edition.
18. Organic Chemistry – Reactions and Mechanisms by Balaji rao- Vishal Publications.
19. Instrumental methods of Chemical Analysis by H. Kaur- Pragati Pragasam Publications, Meerut.

OBJECTIVE:

To study the electrochemical kinetics, over potential, corrosions and fuel cells. To study statistical thermodynamics, Quantum statistics and reversible thermodynamics. To study the principle of photochemical reactions, kinetics – Stern-Volmer Analysis.

UNIT I – ELECTROCHEMISTRY - III

Mechanism of electrode reactions – polarization and overpotential – the Butler-Volmer equation for one step and multistep electron transfer reactions – significance of electron exchange current density and symmetry factor – transfer coefficient and its significance – mechanism of the hydrogen and oxygen evolution reactions.

Corrosition and passivation of metals – Pourbaix diagram – Evan's diagram – fuell cells – electrodeposition- principle and applications- electrochemical inorganic reactions of technological interest.

UNIT II – STATISTICAL THEMODYNAMICS - I

Objectives of statistical thermodynamics – concept of thermodynamics and mathematical probabilities – distribution of distinguishable and non-distinguishable particles.

Maxwell–Boltzmann distribution law – Partition function – evaluation of translational, vibrational and rotational partition functions for mono, diatomic and polyatomic ideal gases – thermodynamic functions in terms of partition functions-application of partition function to heat capacity of ideal gases- nuclear partition function –Heat capacity of solids(Eienstein's and Debye's) ortho and para hydrogen.

UNIT III – STATISTICAL THEMODYNAMICS - II

Fermi - Dirac and Bose - Einstein statistics - comparison with Maxwell–Boltzmann distribution law and their applications – Planks radiation laws – Electon gas (metals) Irreversible Thermodynamics – Forces and fluxes – linear force, flux relation – phenomenological equations.

UNIT IV – PHOTOCHEMISTRY – I

Absorption and emission of radiation – decay of electronically excited states – Jablonski diagram - radiative and non radiative processes – fluorescence and phosphorescence – factors influencing fluorescence and phosphorescence– internal conversion and intersystem crossing – kinetics of unimolecular and bimolecular photophysical processes-excimers and exciplexes – static and dynamic quenching – Stern - Volmerequation.
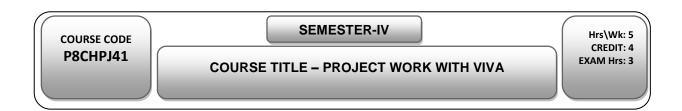
NIT V – PHOTOCHEMISTRY - II

Experimental methods – quantum yield and life time measurements – steady state principle – quantum yield and chemical actinometry – photovoltaic and photogalvanic cells, photoelectrochemical cells, photo assisted electrolysis of water, aspects of solar energy conversion and storage.

TEXT BOOKS
1. S.Glasstone,Introduction To Electrochemistry,Affliated East West Press ,New Delhi,1960.
2. R.Crow, Principles and Applications to Electrochemistry,Chapman And Hall,1991.
3. P.H.Rieger ,Electrochemistry,Chapman And Hall,New York,1994.
4. M.C.Gupta,Statisticaltheromdynamics,WileyEaster,New Delhi,1990.
5. R.Hasee,Thermodynamics Of Irreversible Process,Addition Wesley,Reading,Mass,1969.
6. N.J.Turro,Modern Molecular Photochemistry,Benjamin,Cumming,Menlo Park,California,1978.
7. K.K.RohatgiMukherjee,Fundamentals Of Photochemistry,Wiley Eastern Ltd.,1978.
8. S.Glasston,Text Book Of Physical Chemistry.

SUGGESTED REFERENCE FOR BOOKS
1. J.O.M.Bokris And Ak.NReddy,Electrochemistry,Vols 1and 2 Plenum,New York,1977.
2. P.Dalahay,Electrode Kinetics And Structure Of Double Layer,InterScience,New York,1965.
3. J.Robbins,Ions In Solution-An Introduction In Electrochemistry,Clarendon Press,Oxford,1972.
4. C.M.A.Brett And As.MsO.Brett,ElectrochemistryPrinciples,Methods And Applications,Oup,Oxford,1993.
5. Dole,Themodyanamics,PrenticeHall,New York,1954.
6. B.J.McClenlland,StatisticalThermodyanamics,Chapman And Hall,London,1973.
7. I.Prigogine,Introduction To Themodyanamics Of Irreversible Process,Interscience,New York,1961.
8. N.O.Smith,Elementary Statistical Thermodyanamics,A Problem Approach,PlenumPress,New York,1961.
9. Cleyde,PhysicalChemistry,SchaumSeries,McGraw Hill,1976.
10. Seans,StatisticalThermodyanamics,Salinyar And Tangodie.
11. J.G.Clavert and J.N.Pitts,Photochemistry,Wiley,London,1966.
12. R.P.Wayne,Photochemistry,Butterworths,London,1970.
13. R.Cundell and A.Gilbert,Photochemist Thomas Nelson,10

OBJECTIVE:

   i)   **To carry out a project work to gain knowledge of industries or quality control laboratories**
   ii)   **To impart the knowledge of fundamentals of Research Methodology.**
   iii) **To impart the knowledge about illustration of spectra of inorganic compounds**

I. PROJECT WORK

Project work has to be carried out by each student in consultation with the guide from the department and the report of the project work has to be submitted for the viva voce with the approval of the guide teacher.

II. RESEARCH METHODOLOGY

Research Problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and features of good design – Different research design – Basic principles of experimental designs. Data collection methods – Data types – Processing and presentation of data – Techniques of ordering data – Meaning of primary and secondary data – The uses of computers in research – The library and Internet – Uses of search engines – virtual libraries – common software for documentation and presentation.

III. LIST OF SPECTRA TO BE GIVEN FOR INTERPRETATION.

P^{31} NMR Spectra of methylphosphate.
P^{31} NMR Spectra of HPF_2.
F^{19} NMR Spectra of CIF_3.
H^1 NMR Spectra of Tris (ethythioacctoacetanato) cobalt (III).
ESR Spectra of the aqueous $ON (SO_3)^{2-}$ ion.
ESR Spectra of the H atoms in CaF_2.
ESR Spectra of the $[Mn (H_2O)_6]^{2+}$.
ESR Spectra of the bis (salicyladiminato) copper (II).
IR Spectra of the sulphato ligand.
IR Spectra of the dimethylglyoxime ligand and its Nickel (II) complex.
IR Spectra of carbonyls.
Mossbauer spectra of $FeSO_4$ $7H_2O$.
Mossbauer spectra of $FeCl_3$.
Mossbauer spectra of $[Fe(CN)_6]^{3-}$
Mossbauer spectra of $[Fe (CN)_6]^{4-}$

SCHEME
PROJECT WORK & VIVA VOCE	50 Marks
RESEARCH METHODOLOGY & SPEC. INTERPRETATION	25 Marks
Total	75 Marks

COURSE CODE P8CHEP41	SEMESTER-IV COURSE TITLE – PRACTICAL VII - ORGANIC CHEMISTRY PRACTICAL II	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

OBJECTIVE:

To learn the preparative techniques of Organic compounds and interpretation of spectra.

ORGANIC PREPARATIONS

1. Sym-Tribromo benzene from aniline.
2. Benzanilide from benzophenone
3. m-Nitro benzoic acid from methyl benzoate
4. 2,4.- Dinitrobenzoic acid from p-nitrotoluene
5. m-Nitro benzoic acid from benzaldehyde
6. Benzil form benzaldehyde
7. Anthraquinone from phthalic anhydride
8. Phthalide from phthaic anhydride
9. 2-Phenyl indole from phenyl hydrazine
10. 2, 4 dinitrophenyl hydrazine from p-nitrochlorobenzene

SPECTRAL INTERPRETATION OF ORGANIC COMPOUNDS UV, IR, PMR AND MASS SPECTRA OF COMPOUNDS

1. 1,3,5- Trimethyl benzene
2. Pinacolane
3. n-Propylamine
4. p-Methoxy benzyl alchol
5. Benzyl bromide
6. Phenylacetone
7. 2-Methoxyethyl acetate
8. Acetone
9. Isopropyl alcohol
10. Acetaldehyde diacetate
11. 2-N,N-Dimethylamino ethanol
12. Pyridine
13. 4-Picoline
14. 1,3-dibromo - 1, 1- dichloropropene
15. Cinnamaldehyde

Spectra	:	15 marks
Preparation	:	30 marks
Recrystallization	:	10 marks
Viva Voce	:	10 marks
Record	:	10 marks
Total	:	75 marks

RECOMMENDED BOOKS

1. A text book of Practical Organic Chemistry by Arthur I.Vogel
2. Laboratory Manual of Organic Chemistry Raj K. Bansal, Wiley Eastern limited.
3. Laboratory manual of Organic Chemistry by Mann and Saunders.

COURSE CODE P8CHEP42	SEMESTER-IV COURSE TITLE – PREPARATION OF DOMESTIC PRODUCTS	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objectives:-

- ➢ *To develop self employment skills.*
- ➢ *To become entrepreneur.*

1. Preparation of Detergent washing powder.
2. Preparation of Utensils cleaning powder.
3. Preparation of Normal shampoo.
4. Preparation of Polyvinyl alcohol adhesive.
5. Preparation of Room freshner.
6. Preparation of Liquid blue.
7. Preparation of Pain relieving balm.
8. Preparation of Jasmine perfume liquid.
9. Preparation of Tooth powder.
10. Preparation of Face powder.
11. Preparation of White phenol.
12. Preparation of automobile decarboniser.
13. Preparation of Tooth paste.
14. Preparation of Talcum powder.

SCHEME

EXPERIMENT	55 Marks
RECORD	10 Marks
VIVA VOCE	10 Marks
Total	75 Marks

TEXT BOOKS AND REFERENCES:

1. Venkateswaran V., Veeraswamy R., Kulandivelu A.R. Basic principles of practical chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons (1997).

COURSE CODE P8CHNM41	**SEMESTER-IV** **COURSE TITLE – PRACTICAL VIII- POTENTIOMETRY AND SPECTRAL INTERPRETATION**	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3

List of Experiments

1. Determination of strength of an unknown strong acid by using a standard base.
2. Determination of strength of an unknown weak acid by using a standard base.
3. Determination of strength of the individual concentrations of the two acids in the mixture (Strong and weak) by using a standard strong base.
4. Determination of strength of FAS by using a standard potassium dichromate (redox titration).
5. Determination of strength of KI by using a standard potassium permanganate.
6. Determination of strength of ferrous sulphate by using a standard potassium dichromate (redox titration).
7. Determination of strength of sodium chloride by using a standard silver nitrate solution.
8. Determination of strength of KI by using a standard silver nitrate solution.
9. Determination of strength of individual concentrations of mixture of halides (KCI+KI) using standard silver nitrate solution.
10. Determination of P^H of different buffer solutions by emf method.
11. Determination of strength of weak acid by using a standard base and from the titration curve, the emf at ¼, 1/3, 1/2, 2/3 and ¾ neutralization and hence the dissociation constant of a given weak acid is calculated.

SPECTROSCOPY:

Interpretation of simple UV – Visible, NMR and ESR spectra of simple molecules for the calculation of molecular data and identification of functional groups.

Total Marks: 100 (External 75 + Internal 25)

External marks distrib ution
Spectra	(5+5)	10 Marks
Practical		40 Marks
Procedure		05 Marks
Record		10 Marks
Viva-voce		10 Marks
	Total	75 Marks

OBJECTIVES:
- ✓ *To understand the principles, instrumentations and biological applications of various biochemical techniques.*

UNIT- I: UNITS OF MEASUREMENT   25hrs
Units of measurements of solutes in solution (Normality, Molality, Molarity, Ionic strength, Milli moles). Osmosis and its biological importance, Osmotic pressure, Osmolarity and its applications. Concept of isotonic, hyper and hypotonic solution and its importance in biology. Concept of pH, pOH, biological importance of pH, pH value of bodily fluids, buffer, buffer capacity, Henderson – HasselBalch equation and its importance. Buffers in body fluid-Bicarbonate, Phosphate, hemoglobin and protein buffer. Dialysis and its biomedical importance, colloids and their biomedical importance.

UNIT- II: MEASUREMENT OF pH   20hrs
Principles of electrochemical techniques- EMF, Nernst equation, Reference electrodes – Silver and Calomel electrode. Determination of pH using Hydrogen electrode, glass electrode and pH meter. Principle, instrumentation and applications of Clark oxygen electrode.

UNIT- III: CENTRIFUGATION   20hrs
Basic principles of centrifugation, sedimentation rate, Svedberg unit, sedimentation coefficient, preparative and analytical ultracentrifuge- instrumentation and applications, differential centrifugation, density gradient centrifugation- rate zonal, isopycnic, equilibrium isodensity centrifugation.

UNIT- IV: CHROMATOGRAPHY   20hrs
General principles of chromatography, classification, Principle, operation procedure and applications of- paper chromatography, thin layer chromatography, ion exchange chromatography, molecular sieve chromatography, affinity chromatography, gas liquid chromatography and HPLC.

UNIT- V: ELECTROPHORESIS   20hrs
General principles of electrophoresis, Factor affecting electrophoretic mobility – sample, electric field, supporting medium, buffer. Tiselius moving boundary, paper, cellulose acetate electrophoresis. Native PAGE, SDS-PAGE, agarose gel electrophoresis and immunoelectrophoresis.

TEXTBOOKS:
1. Biophysical Chemistry – Upadhyay and Upadhyay Nath, Himalayan 2009 revised edition.
2. Introduction to Practical Biochemistry – Shawney, Randhir, Singh, Narosa.

REFERENCES:
1. Practical Biochemistry- Principles and Techniques, Keith Wilson and John Walker, Cambridge Press 4th Edition.
2. Practical Biochemistry by K. Wilson and I. Walker. 7th edition, Cambridge University press (2010)
3. Introduction to Instrumental Analysis by Robert D. Braun, Pharma Book Syndicate (2006)
4. Analytical Biochemistry – R.B. Turner, Elsevier, N.Y.
5. Biomedical Instrumentation – M. Arumugam, Anuradha Agencies, Chennai.
6. Instrumental Methods of Analysis – Chatwal and Anand, Himalayan Publication.

CORSE CODE **U8BIPR31**	**SEMESTER-III**	**Hrs\Wk: 2** **CREDIT: 1** **EXAM Hrs: 3**
	COURSE TITLE – PRACTICAL III -VOLUMETRIC ANALYSIS AND BIOLOGICAL PREPARATION	

OBJECTIVES:
- ✓ *To have knowledge about titrimetric analysis.*
- ✓ *To know about the isolation of macromolecules from natural source.*

REAGENTS PREPARATION
1. Normality and Molarity solution
2. Saturated solution, Percentage solution and dilute solution.

VOLUMETRIC ANALYSIS
1. Estimation of oxalate.
2. Estimation of iron.
3. Estimation of nitrite.
4. Estimation of chloride by Mohr's method
5. Estimation of calcium by oxalate method.

BIOCHEMICAL PREPARATIONS
1. Preparation of starch from potatoes.
2. Preparation of casein from milk.
3. Preparation of lactalbumin from milk.
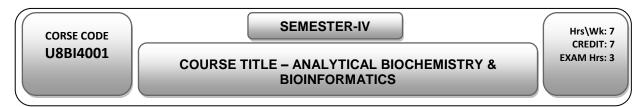4. Preparation of ovalbumin from egg.
5. Preparation of lecithin from egg yolk.

TEXTBOOKS:
1. Text book of Medical Biochemistry – 4[th]Edition, MN.Chatterjee, Rana Shine, Jaypee Publications.
2. Practical Clinical Biochemistry- Harold Varley, CBS, NewDelhi.

REFERENCES:
1. A Biologist guide to principles and techniques of practical biochemistry. Bryan, W. & Keith, W.

2. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd.,Vol.I,II,III.
3. Experimental procedures in Life Sciences by Dr.S.Rajan & Mrs. R. Selvi Christy. Anjaana Book House.
4. Text book of Clinical chemistry –Teitz.
5. Medical Laboratory Science, Theory and Practice J. Ochei& A. Kolhatkar, Tata McGraw
   - Hill.

CORSE CODE U8BI4001	SEMESTER-IV COURSE TITLE – ANALYTICAL BIOCHEMISTRY & BIOINFORMATICS	Hrs\Wk: 7 CREDIT: 7 EXAM Hrs: 3

OBJECTIVES:
- ✓ *To understand the principles, instrumentation and biological applications of various biochemical techniques.*
- ✓ *To understand the basic concepts in bioinformatics*

UNIT- I: ABSORPTION SPECTRUM   **25hrs**
Basic properties of electromagnetic radiation, energy, wave length, wave number, frequency. Absorption and emission spectra. Beer lambert's law. Light absorption and its transmittance. Molar extinction coefficient. Principle, instrumentation, application of Colorimeter. Principle, instrumentation, application of UV- visible spectroscopy - Protein and nucleic acid structural studies and enzyme assay.

UNIT- II: EMISSION SPECTRUM   **25hrs**
Spectrofluorimetry techniques- principle, instrumentation and applications -vitamin assay- riboflavin, enzyme assays, fluorescent probes in the study of proteins and membranes. Atomic absorption spectroscopy- Principle, instrumentation and application. Flame photometry- principle, instrumentation and applications - analysis of trace elements- sodium and potassium.

UNIT-III: RADIO ISOTOPIC TECHNIQUES   **25hrs**
Atomic structure, radiation, type of radioactive decay, half-life, units of radioactivity. Detection and measurement of radioactivity – Methods based on ionization (GM Counter), excitation (Scintillation counter). Autoradiography. Applications of radioisotopes in the elucidation of metabolic pathways, dilution technique, clinical scanning, radio dating, and RIA. Biological hazards of radiation and safety measures in handling radio isotopes.

UNIT – IV: COMPUTER FUNDAMENTALS   **15hrs**
Functional components of a computer (input & output devices, CPU & storage devices), applications of computers, computer operating systems, internet-World Wide Web, useful search engines. E-resources- e-books/e-journals.

UNIT – V: FUNDAMENTALS OF BIOINFORMATICS   15hrs

Introduction to bioinformatics, applications and scope of bioinformatics, Biological databases- nucleic acid and protein sequence data bases, NCBI, GENBANK, introduction to genomics and proteomics, PubMed-finding scientific articles.

TEXTBOOKS:
1. Biophysical Chemistry - Upadhyay and Upadhyay Nath, Himalayan 2009 revised edition.
2. Introduction to Practical Biochemistry - Shawney, Randhir, Singh, Narosa.
3. Lesk, A.M. Introduction to Bioinformatics Oxford 2002.

REFERENCES:
1. Practical Biochemistry- Principles and Techniques, Keith Wilson and John Walker, Cambridge Press 4th Edition.
2. Practical Biochemistry by K. Wilson and I. Walker. 7th edition, Cambridge University press (2010)
3. Instrumental Methods of Analysis – Chatwal and Himalayan Publication.
4. Physical Biochemistry- David Friefelder.
5. Internet & World Wide Web, third edition, Dietel, Dietel, Gold Berg.
6. Multimedia, System design, Prabhat k. Andleigh, Kiran Thakrar.
7. Bergeron BP 2002 Bioinformatics Computing 1st Edition, Printice Hall
8. Bioinformatics: sequence and genome analysis, by David Mount, second edition. Cold spring harbor lab press (2004)

CORSE CODE U8BIPR41	SEMESTER-IV	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3
	COURSE TITLE – PRACTICAL IV- COLORIMETRIC TECHNIQUES & PREPARATION OF BUFFERS	

OBJECTIVES:
- ✓ *To understand about the principles, theory and calculation of colorimetric experiment.*
- ✓ *To have a knowledge of buffer preparations.*

COLORIMETRIC ESTIMATION

1. Estimation of potassium dichromate.
2. Estimation of Amino acid by ninhydrin method.
3. Estimation of Protein by Biuret method
4. Estimation of Carbohydrate by Anthrone method.
5. Estimation of DNA by diphenyl amine method
6. Estimation of RNA by orcinol method
7. Estimation of inorganic phosphorus by Fiske and Subbarow method.

PREPARATION OF BUFFERS

1. Preparation of Phosphate Buffer and determination of PH.
2. Preparation of Tris Buffer and determination of PH.
3. Preparation of Citrate Buffer and determination of PH.

TEXTBOOKS:

1. Text book of Medical Biochemistry – 4th Edition, MN.Chatterjee, Rana Shine, Jaypee Publications.
2. Practical Clinical Biochemistry- Harold Varley, CBS, NewDelhi.
3. Biochemical methods by S. Sadasivam

REFERENCES:

1. A Biologist guide to principles and techniques of practical biochemistry. Bryan, W. & Keith, W.
2. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd.,Vol.I,II,III.
3. Experimental procedures in Life Sciences by Dr. S. Rajan & Mrs. R. Selvi Christy. Anjaana Book House.
4. Text book of Clinical chemistry –Teitz.
5. Medical Laboratory Science, Theory and Practice J. Ochei & A. Kolhatkar, Tata McGraw - Hill.

Objectives
- *To understand the endocrine system and their secretions*
- *To understand the hormone, and the function of hormones in human system*

UNIT – I: CLASSIFICATION AND MECHANISM   15 hrs

Endocrine glands, hormones as chemical messengers, stimulus for hormone release: change in homeostasis, sensory stimulus and others. Hormones- Structures, Receptor type, Regulation of biosynthesis and release (including feedback mechanism). Physiological and Biochemical actions, &Pathophysiology (hyper & hypo secretion).Concept of second messengers like adenylate cyclase system, G-protein, cAMP, cGMP, Ca^{+2}, diacylglycerol, protein kinase C pathway and inositol-tri-phosphate.Basic mechanism of action of Peptide and Steroid hormones.

UNIT – II HORMONES RECEPTORS AND REGULATION   15 hrs

Steroid hormone receptors, intracellular protein receptors, structural organization of receptor protein, hormone binding domain, antigenic domain and DNA binding domain, organization of functional elements – hormone response elements. Structure of insulin receptor, internalization of receptors.

UNIT – III: PITUITARY AND HYPOTHALAMIC HORMONES   15 hrs

Hypothalamic Hormones - Corticotropin-releasing hormone, Thyroid releasing hormone, Gonadotropin-releasing hormone, Prolactin-releasing hormone, Growth hormone–releasing hormone.

Anterior Pituitary hormones- structure, physiological and biochemical actions of Growth hormone, Prolactin, Proopiomelanocortin peptide family, Luteinizing hormone, Follicle-stimulating hormone, Thyroid-Stimulating Hormone; Posterior Pituitary: Vasopressin, Oxytocin.

UNIT – IV THYROID, PARATHYROID, PANCREATIC & GI HORMONES 15 hrs

Hormones of Thyroid - Structure, synthesis, biochemical and physiologic actions of thyroxine, T3, T4. Pathophysiology – Hypo and hyperthyroidism.

Hormones of Parathyroid - Structure, synthesis, biochemical and Physiologic actions of parathyroid hormone, pathophysiology - Hypo and hyper parathyroidism. Regulation of synthesis and secretion of thyroxine and PTH.

Hormones of Pancreas- Structure, synthesis, biochemical and physiologic actions of Insulin, Glucagon.

Hormones of GI tract: Gastrin, Secretin, Cholecystokinin, Gastric inhibitory polypeptide, Ghrelin.

UNIT – V: ADRENAL AND REPRODUCTIVE HORMONES   15 hrs

Hormones of the Adrenal gland – chemical nature & functions of Adrenal Cortex hormones- Steroid hormones; mineralocorticoids, glucocorticoids and androgens. Adrenal medulla hormones- Epinephrine and Nor Epinephrine.

Hormones of the testis and ovaries - cortisol, aldosterone, testosterone, estrogens, progesterone and calcitriol, ovarian cycle and role of hormones.Clinical disorders of hypo and hyper secretion of hormones.

Text Books

1. Harper's Biochemistry by R.K. Murray et al. McGraw- Hill Medical, 25th edition 1999.
2. Text book of Biochemistry (with clinical correlation) by Thomas M. Devlin, John Wiley & sons, 7th edition 2010.
3. Willaim's Text book of Endocrinology by Wilson and Foster, 13th edition W.B. Saunders Co publications 2016.
4. Essentials of Medical Physiology (6th Edition) K. Sembulingam, PremaSembulingam.

References

1. Greenspan's Basic and Clinical Endocrinology, David G. Gardner, 9th edition Mcgraw Hill education publications, 2011.
2. Endocrine Physiology, Patricia Molinam 4th edition Mcgraw Hill education publications, 2013.
3. Endocrinology Mac E. Harley 5th edition, Prentice Hall publications 1999.
4. Harrison's Endocrinology J. Larry Jameson 4th edition Mcgraw Hill education publications, 2016.
5. An introduction to Behavioral endocrinology Randy J. Nelson 4th edition Sinauer associated 2011.
6. Biochemistry, Agarwal, GOBL publications, 1999.
7. Fundamentals of Biochemistry, Donald Voet, Judith G. Voet, Charlott W. Pratt, upgrade edition John Willey & Sons. Inc.
8. Biochemistry, LubertStryer, 4th edition, W.H. Freeman & Co, 1995.
9. Mammalian Biochemistry - White Handler Smith.
10. Basic & Clinical Endocrinology – Francis Sreenspan, Gordon J. Strewler Prentice – Hall International Inc. 5th ed., 1997.

Objectives
- *To give all students, regardless of their background, a comprehensive understanding of the principles of clinical biochemistry.*
- *Understanding the principles and applications of clinical biochemistry in diagnosis.*

UNIT – I SPECIMEN COLLECTION AND ANALYSIS   15hrs

Concepts of accuracy, sensitivity, precision, reproducibility, reliability, and other factors in quality control.Normal values.Specimen collection and Processing, Collection of blood – Venipuncture, skin puncture, arterial puncture.Anticoagulants.Collection and analysis of normal and abnormal urine – timed urine specimens, preservatives Clinical significance of sugars, proteins, ketone bodies, bilirubin and porphyrins.CSF,Amniotic fluid, semen, sputum – collection, composition and analysis.

UNIT – II DISORDERS OF CARBOHYDRATES AND LIPID METABOLISM   15hrs

Disorders of carbohydrate metabolism - blood sugar levels, hyper and hypoglycemia, regulation of blood glucose, renal threshold, diabetes mellitus-etiologic classification and diagnostic criteria, glucose tolerance test, HbA1c, fructosamine, and microalbuminuria, metabolic complications-acute and late complications. Hypoglycemic agents, Glycogen storage diseases, galactosemia, Fructosuria.Plasma lipids, lipoproteins and apolipoproteins abnormalities and role in diseases. Disorders of lipid metabolism - Hyper cholesterolemia, Hypocholestremic agents, lipidosis and hypolipoproteinemas, Taysach's disease, Niemann pick disease, Xanthomatoses, Gaucher's disease, Fatty liver, Obesity, Atherosclerosis, Risk factors.

UNIT – III DISORDERS OF PROTEIN METABOLISM   15hrs

Disorders of protein metabolism – non-protein nitrogenous constituents in blood – urea, uric acid and creatinine.Plasma protein abnormalities – deficiency, agammaglobulinemia, multiple myeloma, proteinuria, glomerulonephritis, nephritic syndrome.Haemoglobinopathies – Sickle cell anemia, thalassemia and erythrocyte enzyme disorders. Phenylketonuria, Tyrosinosis, Alkaptonuria, Maple syrup urine disease, Hartnup disease, Homocystinuria, Albinism, Disorders of Urea Cycle.Bence Jones protein.

UNIT – IV HEPATIC, RENAL AND GASTRIC FUNCTION TESTS   15 hrs

Liver - structure and functions of liver, diseases of liver - hepatitis, cirrhosis, alcoholic liver disease, hepatic tumor, liver function tests. Kidney – structure and function, Acute and chronic renal failure, urinary tract obstruction and analysis of urinary calculi, kidney function tests. Gastric function tests.

UNIT – V FREE RADICALS CANCER AND DISORDERS OF NUCLEIC ACID METABOLISM   15 hrs

Free radicals in health and disease – Endogenous and exogenous free radicals ROS, Oxidative damage to lipids, proteins and DNA.Role of enzymatic and non-enzymatic antioxidants. Cancer, characteristic features, types. Tumor markers – AFP, CEA, HCG

Carcinogenic agents.Inborn errors of Nucleic Acid metabolism.Leschnyhan syndrome, Immuno deficiency diseases associated with defects in Purine nucleotide metabolism, Gout, Oraticaciduria and Xanthinuria.

Text books

1. Text book of Medical Biochemistry, 7th edition M.N. Chatterjee and RaneShinde, Japee Brothers medical publisher Pvt Ltd, 2008.
2. Text book of Biochemistry with clinical correlation, Thomas M. Devlin, 3rd edition, A. John Wiley-Liss Inc. Publication, 2002.
3. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors Pvt Ltd, New Delhi, 2005.
4. Principles of Internal Medicine, Harrison T.R. Fauci, Braunwald, Isselbacher 14th edition, MC-Graw Hill, New york. Volume I and II.
5. Tietz Fundamentals of Clinical Chemistry- 5th edition C.A. Burtis, E.R. Ashwood (Eds) Saunders WB Co.

References

1. Clinical Chemistry in Diagnosis and Treatment Subsequent Edition - Joan F. Zilva, Peter R. Pannall, Philip D. Mayne.
2. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co. Ltd., Vol. I, II, III.
3. Medical Laboratory Science, Theory and Practice J. Ochei and A. Kolhatkar, Tata McGraw - Hill.

CORSE CODE P8BIPR31	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – PRACTICAL V- ANALYSIS OF URINE	

Objectives: *75 Hrs*

- *To understand the principles related to analysis of Urine and relating the abnormal constituent's presence with diseased conditions.*

1. Collection, Preservation and Transportation of Urine
2. Physical analysis of Urine
3. Microscopic analysis of Urine
4. Estimation of protein in Urine
5. Estimation of Ureain Urine
6. Estimation of Creatininein Urine
7. Estimation of Uric Acidin Urine
8. Estimation of Phosphorus in Urine
9. Qualitative chemical analysis of urine for normal and abnormal constituents
10. Urea clearance test
11. Creatinine clearance
12. Analysis of urine using urine analyzer

Text Books

6. Text book of Medical Biochemistry – 4thEdition, MN. Chatterjee, Rana Shine, Jaypee Publications.
7. Text book of Clinical chemistry –Teitz.
8. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd. Vol.I, II, III.

References

1. Practical Clinical Biochemistry- Harold Varley, CBS, NewDelhi.
2. Experimental procedures in Life Sciences by Dr.S.Rajan&Mrs.R.Selvi Christy. Anjaana Book House.
3. Medical Laboratory Science, Theory and Practice J. Ochei& A. Kolhatkar, Tata McGraw - Hill.

CORSE CODE P8BIPR32	SEMESTER-III COURSE TITLE – PRACTICAL VI - CLINICAL ENZYMOLOGY	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives: *75 Hrs*
Learning the assays of diagnostically important enzymes with clinical interpretation.

1. Assay of Acid Phosphatase Activity
2. Assay of Alkaline Phosphatase Activity
3. Assay of Alkaline Aminotransferase Activity (SGOT)
4. Assay of Aspartate Aminotransferase Activity (SGPT)
5. Assay of Lactate dehydrogenase
6. Assay of creatinephospho kinase
7. Assay of Lipase
8. Assay of Amylase
9. Assay of Cholinestarase
10. Assay ofSuperoxide dismutase & Catalase

Text Books

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S.Sadasivan and Manickam
3. Practical clinical Biochemistry – Harold Varley, CBS, New Delhi.
4. Medical Laboratory technology – kanai L. Mukherjee, Tata McGraw Hill Publication and Co. ltd., vol. I, II, III.

References

1. Clinical Laboratory-methods and diagnosis, Vol-I Grad Wohl.

2. Judith Ann Lewis, Illustrated guide to diagnostic tests-students version, Springhouse Corporation, Pennsylvenia, 1994.
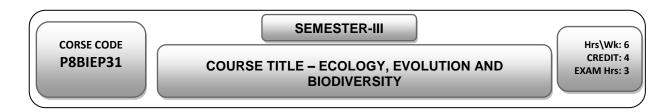3. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors Pvt Ltd, New Delhi, 2005.
4. Tietz Fundamentals of Clinical Chemistry- 5th edition C.A. Burtis, E.R. Ashwood (eds) Saunders WB Co.
5. Interpretation of Diagnostic Test – A Synopsis, Jacques Wallach, 5th Edition, Little brown and company 1992
6. Clinical Chemistry and diagnosis and treatment, Joan Zilva and Pannall P.R., PG Publishing Pvt Ltd
7. Experimental Biochemistry: A Student Companion, BeeduSasidharRao& Vijay Deshpande (Ed), I.K International Pvt. LTD, New Delhi.
8. Introductory Practical Biochemistry, S. K. Sawhney&Randhir Singh (eds) Narosa Publishing House, New Delhi.

CORSE CODE P8BIEP31	**SEMESTER-III** **COURSE TITLE – ECOLOGY, EVOLUTION AND BIODIVERSITY**	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives:
  ✓ *To study about the fundamental processes that cause or prevent adaptive evolution, speciation and extinction.*
  ✓ *To understand the concepts of species, populations, communities, ecosystems and biomes*
  ✓ *To study about the ecosystem and roles in an ecosystem*
  ✓ *To study about environmental issues, ecological basis, ecological evolutionary & biodiversity consequences.*

UNIT – I ECOLOGY & ECOSYSTEM   15 Hrs
Ecology – Environment - atmosphere, hydrosphere, lithosphere, concept of ecosystem, biotic and abiotic components and function habitat, niche, energy flow, food chain, food web, ecological pyramids.Biogeochemical cycle Carbon, Nitrogen, Phosphorus. Structure and function of terrestrial -forest, grassland and aquatic - fresh water, marine, eustarine. Ecological succession:Types; mechanisms; changes involved in succession; concept of climax.

UNIT – II EVOLUTION   15 Hrs

Lamarckism, Darwinism–concepts of variation, adaptation, struggle, fitness and natural selection.Mendelism – spontaneity of mutation.The evolutionary time scale; Eras, periods and epoch; Major events in the evolutionary time scale.extinctions, coextinctions.Evidence of evolution-fossil records and biogeography.

UNIT – III EVOLUTION OF PROKARYOTES AND EUKARYOTES   15 Hrs
Concept of Oparin and Haldane, Experiment of Miller. Evolution of prokaryotes – origin of prokaryotes, unicellular bacterial evolution, origin of Eukaryotes, endosymbiosis,

Margulisendosymbiont theory of evolution, evolution of mitosis, evolution of sex, evolution of meiosis and fertilization.

UNIT – IV POPULATION GENETICS   15 Hrs

Population genetics – Population characteristics, population density, Natality, Mortality, dispersion, Gene pool, Gene frequency, migration and random genetic drift.Species interactions – Mutualism, Commensalism, Amensalism, Predator/Parasite host interaction, competition. Speciation –Allopatric Speciation, PeripatricSpeciationm, sympatric Speciation, polyploidy Speciation.

UNIT – V BIODIVERSITY   15 Hrs

Biodiversity – definition, levels and threats.Endemic and endangered species of India.Methods of taxonomy - Concepts of species and hierarchical taxa, biological nomenclature, classical & quantitative methods of taxonomy of plants, animals and microorganisms. Outline classification of plants, animals & microorganisms- Important criteria used for classification in each taxon. Evolutionary relationships among taxanomy.

Text Books
1. An introduction of Biodiversity Prithipalsingh, Ane's Student edition, 2007.
2. Grzimek'sEncylcopedia of Evolution Dr. H.C. Bernhard Grzimek, Van Nostrand Reinhold publication, 1976.
3. Essential environmental studies by S.P. Mishra S.N. PanueyAne books Pvt Ltd 2011.
4. Text Book of Ecology Eugene P.Oodum.
5. Ecology Environment and Pollution by A.Balasubramanian.
6. Evolution adaptation & ecology – Sanjibchattopadhyay
7. Cell biology, genetics, ecology, evolution – P.S. Verma& V.K. Agarwal – S. Chand Publication

References
1. Biodiversity of Microbial Life – Staley Reysenbach.
2. Glimpses of Biodiversity – B.Bhosetti
3. Evolution, adaption and Ethology, Sanjibchattopadhyay, Books and Allied Pvt Ltd.
4. Text book of Environmental Studies A. Joseph Thatheyus, Norasa publications, 2011.

OBJECTIVE:

The course provides basic insight into principles of pharmacology and toxicology. It also highlights the pharmacodynamics and pharmacokinetics aspect of drugs in general. The emphasis will be on evaluation of toxicity and mechanism of toxicity of xenobiotics.

UNIT I: GENERAL PHARMACOLOGY AND TOXICOLOGY   15 hrs

Nature and source of drugs, routes of drug administration and their advantages, definitions and scope of toxicology.Introduction to ecotoxicology.

UNIT II: MECHANISM OF TOXICITY   15 hrs

Formation of ultimate toxicant of xenobiotics and its interaction with target molecules.

UNIT III: PHARMACODYNAMICS AND PHARMACOKINETICS   15 hrs

Mechanism of drug action, receptors and receptors subtypes, Dose response relationship and combined effect of drugs. Concept of LD50, LC50, TD50 and therapeutic index.

Membrane transport, absorption, distribution of xenobiotics.Brief introduction to biotransformation, Phase- I reactions including oxidations, hydrolysis, reductions and phase II conjugation reactions and excretion of drugs.

UNIT IV: INTRODUCTION AND CLASSIFICATION OF THE DRUGS   15 hrs

Central and autonomic nervous system, neurotoxic agents.Cardiovascular system and cardiotoxic agents.Kidney and nephrotoxic agents.

UNIT V: INTRODUCTION AND CLASSIFICATION OF DRUGS   15 hrs

Anti-inflammatory and analgesic drugs and their related toxicity.Endocrine drugs, Antimicrobial chemotherapeutic drugs

Text books

1. Essentials of Medical Pharmacology, Tripathi KD, 7th Edition, Jaypee Brothers, 2010.
2. Pharmacology and Pharmacotherapeutics,Satoskar R.S., Bhandarkar S.D. and Rege N.N.,21st Edition, Popular PrakashanPvt Ltd, 2010.
3. Quintessence of Medical Pharmacology, Chaudhary S.K., 3rd Revised Edition, Central Book Agency Pvt. Ltd., 2010.
4. Principles of Pharmacology, Sharma H.L. and Sharma K.K., 2nd Edition, Paras Medical, 2011.

References

1. The Pharmacological Basis of Therapeutics, Brunton L.L., Chanbner B.A., and Knollmann B.C., Goodman and Gilman's 12th Edition, McGraw-Hill Professional, 2010.

2. Basic and Clinical Pharmacology, Katzung B.G., Masters S.B. and Trevor A.J., 12th Edition, McGraw-Hill, 2011.
3. Pharmacology, Rang H.P., M.M. Dale, J.M. Ritter., Flower R.J. and Henderson G., 7th illustrated Edition, Elsevier Science Health Science Division, 2011.
4. Modern Pharmacology with Clinical Applications Craig C.R. and Stitzel R.E., 6th Edition, Lippincott Williams and Wilkins, 2003.
5. Lipponcott's Illustrated Reviews: Pharmacology, Harvey R.A., Clark M.A., Finkel R, Jose A.R. and Whalen K, 5th Edition, Lippincott Williams and Wilkins, 2011.
6. Essentials of Pharmacotherapeutics, Barar F.S.K., 6th Revised Edition, S.Chand& Co. Ltd, 2011.
7. Pharmacotherapy: A Pathophysiologic Approach, DiPiro J, Talbert R.L., Yee G., Matzke G., Wells B. and Posey L.M., 8th Edition, McGraw-Hill Medical, 2011.

CORSE CODE P8BI4001	SEMESTER-IV COURSE TITLE – GENETICS AND MOLECULAR BIOLOGY	Hrs\Wk: 5 CREDIT: 5 EXAM Hrs: 3

Objectives:
   ✓ *The major objective of the paper is to envisage thorough knowledge in genetics, genome organizations in organisms and their developmental aspects.*
   ✓ *To understand the basis of molecular biology*
   ✓ *To understand the genetic mutation and repair processes*

UNIT – I MENDELIAN GENETICS   **10hrs**
Mendel's Experiments – principle of segregation - phenotype, genotype, alleles, homologues, heterologous, monohybrid experiment, law of dominance, co-dominance, incomplete dominance, back cross, test cross. Principle of independent assortment - dihybrid experiments, multiple alleles.

UNIT – II REPLICATION OF DNA   **15hrs**
DNA replication - experimental evidence for semiconservative replication – Messelson and Stahl experiment. Enzymes and proteins of DNA replication - DNA helicases,Primer, primase, Primosome, DNA Topoisomerase, single strand DNA binding protein, DNA ligase, DNA polymerase, endonucleases, exonucleases, Reverse transcriptase, telomerase. Eukaryotic DNA replication – Initiation, elongation -leading strand synthesis, lagging strand synthesis, Okazaki fragments, termination.Inhibitors of replication.

UNIT – III TRANSCRIPTION   **10hrs**
Transcription – Enzymes of transcription - RNA polymerase, promoter, enhancers, repressors, regulatory elements.Eukaryotic transcription initiation, elongation, termination, inhibitors of transcription. Post-transcriptional modification of mRNA in eukaryotes – RNA splicing.

UNIT – IV GENETIC CODE AND TRANSLATION   15hrs

Genetic code –deciphering of the genetic code, codon, anticodon, Woobble hypothesis, salient features of genetic code. Translation – formation of aminoacyl-tRNA, initiation, elongation, termination, regulation, post-translational modification in eukaryotes. Inhibitors of protein synthesis.Protein translocation – signal peptide, Endoplasmic and mitochondrial translocation of protein.Gene expression – Lac operon, tryptophan operon.

UNIT – V MUTAGENESIS, DNA DAMAGE AND REPAIR   10hrs

Mutations – physical and chemical mutagens, types of mutations - point mutations and frameshift mutations, nonsense and missense mutation.
DNA repair – direct repair of nicks, nucleotide excision repair, mismatch repair, SOS repair and mutagenic repair.

Text Books
1. Principles and Techniques of Biochemistry and Molecular Biology, 7th edition Keith Wilson and John Walker, Cambridge University Press-New Delhi, 2010.
2. Molecular Biology by David Freifelder Published by Jones & Bartlett Publishers 2004.
3. Genes VIII. by Benjamin M Lewin. New York : Oxford University Press 2004.
4. Genes VII by Benjamin Lewin 7th Edition, Publisher: Oxford University Press, 2000.
5. Instant Notes in Molecular Biology 2nd edition P.C. Turner, A.G. McLennan, A.D. Bates, M. R. H. White, Published by Bios Scientific Publishers Ltd 2000.
6. Cell biology and Genetics - P.S. Verma and V.K.Agarwal, S. Chand publication
7. Concepts of Genetics, by William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino (Author) 11th Edition, 1997.
8. Genetics - ManjuyadavIst Edition, Discovery publishing House 2003.

References
1. Lehninger Principles of Biochemistry 6th Edition by David L. Nelson, Michael M. Cox, New York: W.H. Freeman 2008.
2. Molecular Biology by Robert F. Weaver Hardcover, Third Edition Published March 19th 2004 by McGraw-Hill Science/Engineering/Math.
3. Cell and molecular biology concepts and experiments (3rd ed.): Karp, G.John Wiley & Sons, Inc., New York, 2002.
4. Molecular Biology of the Gene, 5th Edition, James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick, Pearson publication 2002.
5. Molecular Cell Biology 5th Edition by Harvey Lodish, Arnold Berk, Freeman publications, 2003.
6. Lehinger's principle of Biochemistry, Nelson and Cox 2000.
7. Harper's Biochemistry - Rober K. Murray, Daryl K.Grammer, McGrawHill, Lange Medical Books

OBJECTIVES:

- ✓ *To understand the immune system and its function.*
- ✓ *To understand the principles and applications of various techniquesbased on immunological principles.*

UNIT-I- INTRODUCTION & ORGANIZATION OF IMMUNE SYSTEM   10 Hrs

Introduction to immunology: Symbols, organs of immune system- Lymphoid organs. Immunity types – Innate and acquired immunity, Cells of immunity – NK cells, LAK, Macrophages, Neutrophils and Eosinophils.Determinants of innate immunity. Acquired immunity – humoral and cell mediated immunity, development and mechanism. Haematopoiesis.

UNIT-II- ANTIGEN & ANTIBODIES   15 Hrs

Antigens: Definition, criteria for antigenicity, Epitope, Paratope, Haptens. Classification of antigen based on Chemical nature, mode of action, and antigenic determinant. Antibodies: Basic Structure, Classes, Subclasses of Immunoglobins, biological functions, Monoclonal antibodies - Production and applications. Tumour antigens, immune prophylaxis and immune therapy- Vaccines and their types.

UNIT-III- COMPLEMENT SYSTEM   10 Hrs

Complement: Definition, components, activation, pathways of activation – classical complement pathway and Alternative complement pathway. Biological activities of complement components.Disease due to complement abnormalities.HLA/MHC complex.

UNIT-IV- HYPERSENSITIVITY   15 Hrs

Hypersensitivity – definition, Classification based on coombs and gel, based on onset of action, and based on mechanism of action. Types of hypersensitivity – type I, II, II, IV, V and their mechanisms. Anaphylaxis - Clinical aspects of Anaphylaxis and serum sickness. Transplantation immunity and mechanism of graft rejection.

UNIT-V- IMMUNO TECHNOLOGY   10 Hrs

Techniques based on antigen- antibody reactions and their applications - Agglutination test and its type, Precipitation, Complement fixation test, immuno assays using labelled reagents- immunofluorescence, ELISA, RIA, RAST and RIST, western blotting. Commonly used immunological tests – ASO, WIDAL, VDRL, RPR, TPH, Viral diseases, hepatitis B & C, HIV.
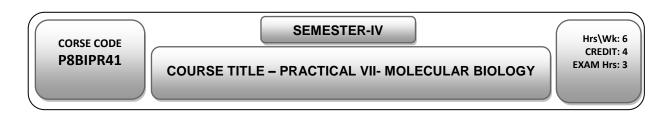
Text books

1. Immunology - A Short Textbook. MdAkramHussain. Second Edition, Jaypee publications 2003.
2. Immunobiology- Janeway's Murphy, K.,Travers, P. and Walport, M. Garland Science, Taylor and Francis Group, LLC. 2008.

3. Immunology - KubyKindt, T.J.,Goldsby, R.A. and Osborne, B.A. W.H. Freeman and Co, New York, 2007.
4. Fundamental of Immunology - Lippincotpraven publications, 4th edition.
5. Immunology - Geoffrey zubay, W.M.C, Brown publishers, 4th edition 1992.

References
1. Essential Immunology –Peter J Delves , Seamus J. martin, Dennis R Burton, Ivan M. Roitt, Blackwell Publishing, Massachustts, USA 1998.
2. Basic and Clinical Immunology. Stites D.P. Stobo, J.D. Fundanberg. H.A and Wells. J.V. 6th edition Los Atlas Lange 1990.
3. Immunology- Charles. A. Janeway. J.R. Paul Travels 4th edition: Black well Scientific Publishers, 1994.
4. Immunology, Kuby Richard. A. Goldsby, Thomas. J.Kint, Barbara. A. Osborne, 4th Edition, W.H. Freeman and Company, New York 2000

CORSE CODE P8BIPR41	SEMESTER-IV	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – PRACTICAL VII- MOLECULAR BIOLOGY	

Objectives: *75 Hrs*

   ✓ *To understand the principles, techniques and applicationsof molecular biology techniques*

1. Fractionation of subcellular organelles by differential centrifugation.
2. Estimation of Protein
3. Estimation of DNA.
4. Estimation of RNA
5. Sodium Dodecyl Sulfate Poly Acrylamide Gel Electrophoresis (SDS - PAGE).
6. Study of proteins by native gel electrophoresis- SOD and CAT.
7. Isolation and separation of genomic DNA
8. Agarose gel electrophoresis of DNA.
9. DNA Ligation.
10. Restriction enzyme digestion of DNA.
11. Separation of Isoenzymes – LDHby electrophoresis.
12. Semidry Blotting (Demonstration).
13. Polymerase chain reaction (Demonstration).

Text Books
1. Experimental procedures in Life Sciences by Dr.S.Rajan&Mrs.R.Selvi Christy. Anjaana Book House 2005.
2. Medical Laboratory Science: Theory and Practice ArundhatiKolhatkar, J. Ochei Published by Tata McGraw-Hill Education Pvt. Ltd., 2000.
3. Practical Clinical Biochemistry, by Harold Varley Published by CBS Publishers & Distributors Pvt. Ltd., New Delhi 2005.

References

1. Molecular Cloning: A Laboratory Manual (Fourth Edition) Green and Sambrook Cold Spring Harbor Laboratory Press, 2001
2. Medical Laboratory Technology, Vol. I,II,III: Procedure Manual for Routine Diagnostic Tests, Kanai L. Mukherjee &SwarajitGhosh (Eds) Published by Tata McGraw-Hill Education Pvt. Ltd., 2010.
3. Textbook of Medical Biochemistry. 4th Edition by ShindeRana, Chatterjea MN, Jaypee Brothers Medical Publishers (P) Ltd, 2000.
4. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 5th Edition By Carl A. Burtis, PhD, Edward R. Ashwood, MD and David E. Bruns, MD 2012.
5. Practical Methods in Molecular Biology Robert F. Schleif, Pieter C. Wensink, 2011.

COURSE CODE P8BIPJ41	SEMESTER-IV COURSE TITLE – PROJECT WITH VIVA	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

COURSE WORK

1. Projects would be allotted to III Semester students which have to be carried out and completed in Semester IV.

2. A list of projects will be finalized and announced by the Department. The students will have an option to select the project in their field of interest.

4. The project will comprise of the following:

   a. Study of background material
   b. Collection of data, procurement and fabrication of experimental set up and
   c. Writing of computer programs if needed.
   d. Giving a preliminary seminar in the Project before submission of Project for the purpose of assessment.
   d. Writing a dissertation or project report. This will be submitted by the students at the end of IV semester.

Viva-Voce

The Final evaluation of the project work completed will be done by external and internal examiners appointed by the Board on the basis of an oral presentation and the submitted Project-Report.

Objectives:

The objective is to educate the students on the basic research, research design, and principle in scientific research, data collection and analysis of significance data.

UNIT - I FUNDAMENTALS OF RESEARCH METHODOLOGY   10 Hrs

Definition of research – Objectives of research, general characteristics of research, qualities of researcher, criteria for good research, Types of Research, approaches and significance of Research. Problems encountered in research, Motivation in Research.

UNIT - II IDENTIFICATION OF RESEARCH PROBLEMAND RESEARCH DESIGN   10 Hrs

Scientific thinking, what is a research problem, source of research problem, identification of research problem, defining the problem, evaluation of a Problem. Research design- contents and types of research design, factors affecting research design.

UNIT III – THE RESEARCH HYPOTHESES   10 Hrs

Meaning of Hypothesis, Definitions of Hypothesis, Importance of Hypothesis, Characteristics of a Good Hypothesis, Variables in a Hypothesis, formulating a Hypothesis, Testing the Hypothesis

UNIT IV - DATA COLLECTION AND ANALYSIS   15 Hrs

Definition of data, classification of data-primary data, secondary data, methods of data collection - interview method and questionnaire method, merits and limitation of data. Basics of Statistical analysis of data- measures of central tendency – mean, median, mode. Merits and demerits of Standard deviation, correlation, regression, t-test, ANOVA.

UNIT V – THESIS WRITING   15 Hrs

Nature of thesis writing – logical format for writing thesis- Abstract, Introduction, review of literature, Materials and methods and discussion, Effective illustrations- Tables, graphs, diagrams and figures, Reference styles- Harvard and Vancouver systems.

Text Books

1. Research methodology, Methods and techniques- C.R.Kothari-Vishwapragasam Publications, 2nd edition.
2. Research methodology – P.Ravilochanan, Margham publications, Chennai.
3. Research ; An introduction – Robert Ross – Harper and Row Publications
4. Research methodology – P.Saravanavel – Kitlabmahal, 6th edition.
5. A hand book of methodology of Research – RajammalP.A.Devadas-Vidhalaya press.
6. Introduction to computers – N.Subramanian

References

1. Statistical methods – G.W.Snedecor and W.Cocharan- Oxford and IBH, New delhi
2. Research methodology methods and statistical techniques –Santhoshgupta.
3. Statistical methods- S.P.Gupta
4. Scientific social survey and research – P.Young –Asia publisher, Bombay.
5. How to write and publish a scientific paper – R.A.Day, Cambridge University Press.
6. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

CORSE CODE P8BIEP42	SEMESTER-IV COURSE TITLE – BIOSTATISTICS AND BIOINFORMATICS	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objectives
- *To understanding of theoretical and conceptual framework for quantitative reasoning, such as aspects of mathematics, statistics and logic Solve problems quantitatively using appropriate arithmetical, algebraic, or statistical methods.*
- *To create and interpret visual representations of quantitative information, such as graphs or charts*
- *To understand and critically assess data collection and its representation*
- *Understand statistics - basic theory, and application of Bioinformatics*

UNIT – I INTRODUCTION TO BIOSTATISTICS   10 hrs

Biostatistics –definition, scope, applications and limitations. Data- Collection, classification, tabulation of statistical data. Organization of data - Individual series, discrete series, continuous series / class interval.Diagrammatic and graphical representation of statistical data (bar diagram, line diagram, pictogram, histogram & horizontal and vertical bar diagram).

UNIT - II MEASURE OF CENTRAL TENDENCY   10hrs

Introduction, Characteristics of a good average, Mean, Median, Mode (Raw, Discrete & Continuous data), calculations, merits and demerits.

UNIT - III MEASURE OF DISPERSION   10 hrs

Introduction, definition, classification & properties.Variability, Range - Introduction, definition, location of range in individual, discrete, continuous series, merits and demerits of Range.Standard deviation, standard error, Variance, Coefficient of variation, merits and demerits.

UNIT - IV PROBABILITY & CORRELATION ANALYSIS   15hrs

Probability - Introduction, Definition, Kinds of Probabilities.
Correlation Analysis - Introduction, Definition, uses, correlation and causation, kinds of correlation. Types of correlation - Positive and negative, linear and nonlinear, simple and multiple, partial and total correlation.

UNIT – V BIOINFORMATICS   15 Hrs

Introduction to Bioinformatics – database concepts, data base management system, database security, biological databases – types. Protein and Nucleic acid sequence alignments, Sequence databases, the use of algorithm BLAST, Multiple sequence alignments. Genome and organism specific database.

Text Books:

1. Biostatistical analysis - Jerrold H. Zar 5th edition Prentice Hall of India 2010.
2. Statistical Methods, S.P.Gupta 28th edition Sultan Chand & Sons 2009.
3. Introduction to Bioinformatics by T.K Atwood and D.J Parry- Smith Publisher: Pearson Education Pvt Ltd 2002.
4. An Introduction to Biostatistics, 3nd Edition by Thomas Glover, Kevin Mitchell.
5. An Introduction for Biostatistics [2nd edition] Prestographit, vellore, India SundarRao P.S.S, Jesudian.G&Richard.J 1987.
6. Biostatistics - P. Rama Krishna, Saras Publication 1995.

References

1. Introduction To Biostatistics And Research Methods By P. S. S. SundarRao, J. Richard 5th edition PHI learning Pvt Ltd 2012.
2. Bioinformatics A Practical Guide to the analysis of Genes and Proteins, Andreas D Baxevanis and BF Francis Oueliene A John wiley& sons, INC, Pub 2001.
3. Bioinformatics – Sequence and Genome Analysis David W Mount, CBS Publishers, Ian Korf, Mark Yandell& Joseph Bedell, 2003.
4. Biostatistics: A Foundation for Analysis in the Health Sciences, 10th Edition Wayne W. Daniel, Chad L. Cross Wiley Global Education, 2012.

Objectives
- ▪ *To understand the anatomical structures and the physiological functions of body systems.*
- ▪ *To understanding of neurophysiology, respiratory, cardiovascular and digestive and excretory physiology of human system.*

UNIT – I BLOOD, AND CIRCULATION & MUSCLE PHYSIOLOGY   10 Hrs

Blood corpuscles, hemopoiesis and formed elements, plasma function, blood volume, blood volume regulation, blood groups and Rh typing, hemoglobin, immunity, hemostasis.Mechanism of Blood clotting. Muscle – types and their mechanism of action.

UNIT – IICARDIOVASCULAR SYSTEM &SENSE ORGANS   10 Hrs

Comparative anatomy of heart structure, myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle, heart as a pump, blood pressure, neural and chemical regulation of all above, Pace maker.

Physiology of vision: Structure of eye, image formation and defects of the eye, Receptor mechanism of the eye, photo pigments, Visual cycle and colour adaptation.

Sense organs – structure of hearing, defect of hearing and tactile response.

UNIT – IIIRESPIRATORY SYSTEM & THERMOREGULATION   10 Hrs

Comparison of respiration in different species, anatomical considerations, transport of gases, exchange of gases, waste elimination, neural and chemical regulation of respiration.

Thermoregulation - Comfort zone, body temperature – physical, chemical, neural regulation, acclimatization

UNIT – IVNERVOUS SYSTEM&REPRODUCTIVE SYSTEM   10 Hrs

Neurons, action potential, gross neuro-anatomy of the brain and spinal cord, central and peripheral nervous system, neural control of muscle tone and posture. Nerve impulse, conduction of nerve impulse - myelinated, non-myelinated fibres, synapse, synaptic transmission, neuro macular junction, reflex action.

Reproductive organ - Hormonal regulation of testicular and ovarian function.Spermatogenesis and Oogenesis.Puberty, pregnancy and lactation.Contraceptive methods.

UNIT – VDIGESTIVE & EXCRETORY SYSTEM   10 Hrs

Digestion and absorption of carbohydrates, protein, fat, energy balance, BMR. Comparative physiology of excretion, kidney, urine formation, urine concentration, waste elimination, micturition, regulation of water balance, blood volume, blood pressure, electrolyte balance, acid-base balance.

Text Books

1. Human Physiology 11th Edition (Volume 1) by C.C.Chatterjee 2016.
2. Human Physiology: An Integrated Approach 5th Edition by Dee UnglaubSilverthorn 2010.

3. Text Book of Medical physiology – Guyton & Hall, 2015.
4. Human Physiology – Dr. N. Arumugam, Saras publications.
5. Human Physiology and Mechanisms of Disease by Guyton, 6th edition, Saunders Publications 1996.
6. Review of medical physiology, William. F. Ganong, 14th edition, A Lange Medical book.
7. Human physiology, 2nd edition- BJ Mejer, HS Meij, AC Meyer, AITBs publishers abd distributers.

References

1. Human Body in health and Diseases, Barbara Janson Cohen, Jasan J Taylor, Memmler's 10th edition, Lippincott Willaims&Wilkuns publications.
2. Review of Medical Physiology by William. F. Ganong. McGraw-Hill Medical; 22 edition 2005.
3. Human Physiology & Mechanism of Disease by Guyton MD, Arthur C, 6th edition.
4. Vander's Human Physiology 11th edition, Widmaler, E.P, Raff.H, Strang,K.T McGraw Hill International Publications 2008.
5. Human Physiology 7th edition Fox, S.I. McGraw Hill Publications 2002.
6. A Hand Book of Basic Human physiology- K. Saradhasubramanyam, S. Chand & Co., Ltd.

| CORSE CODE U8BT3001 | SEMESTER-III

COURSE TITLE – IMMUNOLOGY | Hrs\Wk: 7 CREDIT: 7 EXAM Hrs: 3 |

Objectives: To focus the immunological principles, immunity with reference to human.

Unit I – Fundamental concepts and Immune System

Cells of innate and acquired immunity. Organs the immune system. Primary and secondary responses. Antigens – Definition, antigenicity and immunogenicity, antigenic determinants, epitopes, haptens.

UNIT II – B and T Lymphocytes & immune responses

Immunoglobulins structure and classes, Cell Mediated and Antibody Mediated immunity, B-Cell maturation, activation and differentiation; Generation of antibody diversity. T cell maturation, activation and differentiation, functional T cell sensors; cytokines – Properties, receptors and therapeutic uses; Antigen processing and presentation.

UNIT III Antigen – Antibody interactions

Precipitation, agglutination and complement mediated immune reactions; Basic and Advanced immunological techniques – Immunodiffusion, Double Immunodiffusion RIA, ELISA, Western Blotting, ELISPOT assay, immunofluorescence, flow cytometry and immunoelectron microscope.

UNIT IV– Vaccinology

Active and passive immunization, Live and killed, attenuated, subunit vaccines, vaccine technology - role and properties of adjuvants, recombinant DNA and protein based vaccine, plant based vaccines, peptide vaccines, conjugate vaccines.

UNIT V – Clinical Immunology

Immunity to Infection – Bacterial, Viral, fungal and parasitic infections (with examples from each group). Hypersensitivity Type I-V; Transplantation immunological basis of graft rejection; clinical transformation and immunosuppressive therapy.

REFERENCE BOOKS:

1. Kuby, RA Goldby, Thomas J. Kindt, Barbara, A. Osborne. Immunology 6th edition, Freeman 2002.
2. Brostoff J. Seaddin, JK Maleo, Roitt IM, Clinical Immunology 6th Edition, Gower Medical publishing, 2002.
3. Janeway et al, Immunology 4th Edition, current biology publications,1999
4. Paul, Fundamental of immunology 4th Edition, Lippcott Raven, 1999
5. Goding, Monoclonal antibodies, Academic press 1985.

<table>
<tr><td>CORSE CODE
U8BTPR31</td><td>**SEMESTER-III**

COURSE TITLE – PRACTICAL III- IMMUNOLOGY</td><td>Hrs\Wk: 2
CREDIT: 1
EXAM Hrs: 3</td></tr>
</table>

1. A,B,O – Blood Typing
2. Rh-Blood Typing
3. Total Count of RBC
4. Total Count of WBC
5. Differential Count of WBC
6. Antigen Preparation
7. ELISA – Demonstration
8. Immunodiffusion

Spotters
1. Haemocytometer – RBC chamber
2. Haemocytometer – WBC Chamber
3. Micropipette
4. Compound Microscope
5. Immunoglobulins
6. Antigen

REFERENCE
1. Paul, Fundamental of immunology 4th Edition, Lippcott Raven, 1999
2. Brostoff J. Seaddin, JK Maleo, Roitt IM, Clinical Immunology 6th Edition, Gower Medical publishing, 2002.
3. Practical Immunology- Rabindra Narian.

<table>
<tr><td>CORSE CODE
U8BTAL31</td><td>**SEMESTER-III**

COURSE TITLE – ALLIED- BIOSTATISTICS</td><td>Hrs\Wk: 7
CREDIT: 6
EXAM Hrs: 3</td></tr>
</table>

Objectives: Basic principles of statistical analysis with reference to Biological sample.

Unit 1: Statistics and biostatistics Definition - role of biostatistics in Biological Science - Biostatistics for Epidemiology.

Unit 2: Population, Sample, variable, parameter, primary and secondary data, screening and representation of data. Frequency distribution, tabulation, bar diagram, histograms, pie diagram, and cumulative frequency curves.

Unit 3: Mean, median, mode, quartiles and percentiles, measures of dispersion: range, variance, standard deviation, coefficient of variation, symmetry: measures of skewness and kurtosis.

Unit 4: Hypothesis Testing Student T and Chi-square test - Probability and Distribution Concepts and problems on probability, Binomial, Poisson, Normal Distribution and their Applications

Unit 5: Application and uses of Biostatistics: Introduction to MSEXCEL and SPSS. Use of in-built statistical functions for computations of Mean, S.D., Correlation coefficients etc. Use of bar diagram, histogram, scatter plots.

REFERENCE BOOKS:

1. Bliss, C.J.K. (1967) Statistics in Biology, Vol. I Mc Graw hill. New York.
2. Campbell R.C. (1974) Statistics for Biologists, Cambridge Univ, Press, Cambridge
3. Daniel (1999) Biostatistics (3rd edition) Panima Publishing, Compotation
4. Sward law, A.C.(1985) Practical Statistics for Exponents Biologists, John Wiley and Sons, In
5. Khan (1999) Fundamentals of Biostatistics Publishing Corporation
6. Textbook of Biostatistics – 2012. M.Arumugam, Sara's publication

CORSE CODE U8BTAP31	**SEMESTER-III** **COURSE TITLE – ALLIED PRACTICAL - BIOSTATISTICS**	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3

1. Calculation of Mean, Calculation of Median, Calculation of Mode – using Neem leaves / Fish
2. Calculation of Correlation using Neem leaves and Regression analysis
3. Computational exercise for Mark sheet preparation
4. Computational exercise for Invoice bill preparation
5. Computer exercise for Graphical Tools – Line, Bar, Histogram, Pie diagram

Books for Reference

1. Sward law, A.C.(1985) Practical Statistics for Exponents Biologists, John Wiley and Sons, In
2. Khan (1999) Fundamentals of Biostatistics Publishing Corporation
3. Textbook of Biostatistics – 2012. M. Arumugam, Sara's publication.

OBJECTIVE

This course provides a sound knowledge to the students, the details about the various techniques and their applications in the biological field.

UNIT-I

Laboratory equipments- Weighing Balance, pH meter, Centrifuge, Autoclave, Laminar air flow, Incubator, Hot air oven, Water bath, Magnetic stirrer, Vortex mixture, Calorimeter, Hotplate, PCR machine, UV Transilluminator, homogenizer, Gel-document, Nano-drop, colony counter and Fermentor.

UNIT-II

Principles, working and Applications of Microscopy- Light microscope- Compound microscope, phase contrast microscope and fluorescence microscope. Electron microscope- Transmission Electron Microscope(TEM), Scanning Electron Microscope (SEM), Atomic Force Microscope (AFM).

UNIT-III

Centrifuge - Basic principles and Applications. Centrifuge types- Zonal, Density, Gradient Centrifugation, Differential Centrifugation. Basic principles and Applications of Ultra centrifuge. Theory and Application of SDS-PAGE, Agarose Gel Electrophoresis, Immuno Electrophoresis, ELISA, RIA, Southern, Northern and Western Blotting.

UNIT-IV

Spectroscopy-Measurement of transmittance and absorbance - Beer and Lamberts law. Qualitative and quantitative absorption measurement. General Principles, instrumentation, applications of UV and visible spectroscopy.

UNIT-V

General principles, instrumentation and applications of chromatographic techniques –Paper chromatography, Thin Layer chromatography, Column chromatography, Ion exchange chromatography, Gel filtration, Affinity, Gas Liquid chromatography, High Performance Liquid Chromatography (HPLC) and Fast protein liquid chromatography (FPLC).

BOOKS RECOMMENDED

1. Bioinstrumentation, John Webster, (2004). John weily &Sons
2. Biochemistry, Vote, D and Vote, J.G. (2007), Second edition. John wiely & Sons
3. Upadhyay, Upadhyay and Nath "Biophysical chemistry Principles and Techniques" Himalaya Publishing house 2009.
4. Keith Wilson and John walker "Principles and Techniques of Biochemistry and Molecular biology" 7th edition. Cambridge University Press, 2010.
5. Bioinstrumentation, Veerakumari (2012). First edition. MJP Publisher.

<table>
<tr><td>CORSE CODE
U8BTPR41</td><td>SEMESTER-IV
COURSE TITLE – PRACTICAL IV- BIOINSTRUMENTATION</td><td>Hrs\Wk: 2
CREDIT: 1
EXAM Hrs: 3</td></tr>
</table>

1. Study of Compound Microscope. Observation of microbial samples.
2. Isolation of DNA from animal and plant tissues by Centrifugation.
3. Separation of DNA by Agarose gel electrophoresis
4. Separation of Amino acids and Plant pigments by Thin layer Chromatography.
5. Separation of cell organelles by differential centrifugation
6. Separation of plant extracts using column chromatography
7. Quantification of DNA and RNA samples using UV-Spectrophotometer
8. PCR- Technique demonstration.

BOOKS RECOMMENDED
1. Instrumental methods of Chemical analysis- B.K.Sharma and Goel (1998).
2. Light microscopy in Biology- A.J.Laccy (2001).
3. Practical Biochemistry – David plummer- Tata macraw Hill (2007).

<table>
<tr><td>CORSE CODE
U8BTAL41</td><td>SEMESTER-IV
COURSE TITLE – ALLIED- FOOD PROCESSING
TECHNOLOGY</td><td>Hrs\Wk: 7
CREDIT: 6
EXAM Hrs: 3</td></tr>
</table>

Objectives: *To understand better the various technologies of food processing.*
                 To make the students to store and process the common fruits and vegetables

UNIT- 1
Scope and importance of food processing. Properties of food – Physical, thermal and mechanical – Quality enhancers, contaminants. Biotechnological Approach to improve nutritional Quality . Microbial changes in fermented food.

UNIT-2
Raw material preparation – Cleaning, Sorting, Grading and Peeling. Processing Methods – Heating, Bleaching and Pasteurization. Freezing, Dehydration, Canning, Additives, Fermentation, Extrusion Cooling, Hydrostatic pressure cooking, Direct heating, Microwave processing and Infra radiation processing – Concepts and equipment used.

UNIT – 3
Storage of raw and packed foods: cereals - puffed cereals from broken rice – storage of rice and rice products –wheat products – fresh fruits and vegetables – non alcoholic beverages – tea, coffee and cocoa – vegetable juices.

UNIT – 4

Fruit and vegetable processing – Mango pulp processing – Tomato processing. Pickles and Sauerkraut technology. Mushroom processing. Onion processing. Vegetable juices and concentrated products. Sensory evaluation methods for fruits and vegetable products.

UNIT – 5

Quality control and – definition. Aspects of quality control – Quality control tools. Quality control chart – Quality factors in food – Introduction to ISO 9000 & IS 14000 series, PFA, MPO, BIS, Codex Alimentaries & FPO rules, HACCP, GMPs.

REFERENCES

1. Introduction to food engineering, **R. Paul Singh** , Academic Press.B – 2000
2. Molecular approaches to improving Food quality and safety, **Bhatnagar.D and Cleveland.T** ,Van Nostand Reinhold, New York – 1992
3. Fruit and vegetable preservation- Principles and Practices, **Sri Vastava R and Sanjeev Kumar** International Book Distributing Co – 1998
4. Fruit and vegetable processing, **Sumaa Bhatti, Uma varma** ,CBS Publishers
5. Outlines of Dairy Technology ,**De Sukumar,** Oxford University Press, New Delhi – 1999

CORSE CODE U8BTAP41	SEMESTER-IV	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3
	COURSE TITLE – ALLIED PRACTICAL - FOOD PROCESSING TECHNOLOGY	

1. Estimation of iodine value, acid value, Saponification value, Reichert Missiel number of fats and oils.
2. Pasteurization and homogenization of milk.
3. Preparation of canned peas, potato etc.
4. Preparation of fermented food.
5. Processing of Tomato juice/jam
6. Processing of Mango Pulp
7. Processing of Mushroom
8. Waxing of Fruits
9. Visit to food processing unit

REFERENCES

1. Fruit and vegetable preservation- Principles and Practices, *Sri Vastava R and Sanjeev Kumar International Book Distributing Co – 1998.*
2. Fruit and vegetable processing, *Sumaa Bhatti, Uma varma ,CBS Publishers*
3. Introduction to food engineering, **R. Paul Singh**, Academic Press.B – 2000.

Objectives: To focus the immunological principles, immunity with reference to human pathophysiology and welfare.

Unit-1 History and scope of Immunology. Cells of the immune system; adaptive and innate immunity; primary and secondary lymphoid organs; nature of antigens; chemical and molecular basis of antigenicity – immunopathology.

Unit-2 Antibodies – types – immunoglobulin – properties – antigen – antibody reactions – *in vitro* and *in vivo* [Agglutination, precipitation, neutralization]. Complement activation – classical, alternate and lectin pathways, biological role of compliment activation.

Unit-3 Immunizing agents – Vaccines – conventional, molecular vaccines; types of vaccines – Toxoids – Antisera – Monoclonal antibodies.
    Immunity to viruses – immunity to Bacteria and fungi – immunity to protozoa and Worms. Immunofluorescence, ELISA and RIA - Major Histocompatibility complex.

Unit-4 Autoimmunity – Immunological tolerance, transplantation immunity Primary immunodeficiency – B-cell deficiencies, T-cell deficiency – secondary immune deficiency – drugs, nutrition AIDS – stem cell research and status in India. Immune therapy of infectious diseases – types and principles of immunization, natural and artificial immunotherapy.

Unit-5 Hypersensitivity – Types of Hypersensitivity and it is mechanisms. Role of T-cells – Allergens – Mast cells and basophiles – genetics of allergic disease – Mechanisms of damage – Blood and platelets – Transplantation and rejection – Histocompatibility antigens – role of T-lymphocytes – Genetic predisposition to graft rejection.

Reference Books

- Kuby J, Cameron J, Todd C, Mitchell J, Immunology, W.H. Freeman and Co., 2000.
- Elgert KD, Immunology: Understanding Immune system, John Wiley and Sons, 1996.
- Roitt I, Brostoff, Male, Immunology, Mosby Publications, 2001.

Objective:

This course aims to introduce the basic and applied Microbiology. The contents of this course will help students to understand the introduction and importance of microbes in various fieldsof industries, agriculture and waste management for various process and research.

Unit I:

Microorganisms: Classifications – Prokaryotes and Eukaryotes - cell structure; Screening of microorganisms: Microbial culture techniques – factors affecting growth – Isolation, Purification and Preservation -Primary and Secondary screening – Strain improvement. Staining techniques: – Simple and differential staining.
Microscopy – Bright field, Dark field, SEM, TEM.

Unit II:

Microbial genetics - organization of genetic material in prokaryotic and eukaryotic microorganisms – bacterial conjugation, transformation, transduction – physical and chemical method of gene transfer; Transposons and its uses in genetic analysis- concepts of regulation of gene expression in organisms.

Unit III:

Microbes in food -Food produced by microbes, bread, cheese, vinegar - fermented dairy products andoriental fermented foods, Probiotics - microbial cells as food-single cell proteins; pickling, mushroom cultivation,production of alcohol and fermented beverages, beer and wine.

Unit IV:

Microbial production of organic acids – Acetic acid, Citric acid, Lactic acid, Amino acid production- L-Glutamic acid and L-Tryptophan, Enzyme production – Amylase, Protease, Lipase. Production of Vitamins – Vitamin B12, Riboflavin. Antibiotics production – β Lactum antibiotics, Peptide antibiotics.Bioplastics from microbes – PHB & PHA.

UNIT V:

Microbial wastewater and solid waste treatment - Biological, aerobic, anaerobic, primary, secondary and tertiary treatments. Activated sludge and Anaerobic digestion process. Treatment of industrial effluents by microorganisms,Composting. Microbiology of degradation of xenobiotics. Bioremediation -Insecticides, pesticides and heavy metals.

References Books:

1. Prescott's Microbiology, Joanne M. Willey, Linda M.Sherwood, Christopher J. Woolverton 8th Edition McGraw-Hill Publishers.
2. Microbiology, M.J. Pelzer Jr., E.C.S. Chan and N.R Kreig,1993. McGraw Hill Inc., New York.

3. Wulf Cruger and Anneliese Cruger., Biotechnoloogy, (A text book of industrial Microbiology), Panima Publishers, New Delhi, 2nd edition, 2003.
4. Pharmaceutical Microbiology – W.B.Hugo& A. D. Russell Sixth edition. Blackwell scientific Publications.
5. Stanbury, P.F., and Whitaker, A., Principles of Fermentation Technology, 2nd Edition, Pergamon Press, Oxford, 2005

CORSE CODE P8BTPR31	SEMESTER-III COURSE TITLE – PRACTICAL V- IMMUNOTECHNOLOGY	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

1. Isolation of Coli form from sewage.
2. Antigen Preparation – heat treatment.
3. Antigen Preparation – Chemical treatment.
4. Single Radial Immuno diffusion test.
5. Double Immuno diffusion test.
6. Auchterlony double diffusion.
7. ELISA.
8. Protein separation – SDS-PAGE.
9. Heamagglutination Test

BOOKS FOR REFERENCE
1. Manual of Practical Immunology- Aruna Bhatia, Paramount Publication.
2. Biotechnology Lab Practicals- Debajit Borah, Global Vision Publishing House 2012.
3. Roitt I, Brostoff, Male, Immunology, Mosby Publications, 2001

CORSE CODE P8BTPR32	SEMESTER-III COURSE TITLE – PRACTICAL VI- MICROBIAL TECHNOLOGY	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

- Isolation and identification of microbes in ETP.
- Identification and enumeration of bacteria and fungi from soil, water and air
- Staining techniques – Simple staining, gram stain, acid fast, capsular and endospore staining
- Biochemical tests for bacterial identification (IMViC test)
- Identification fungal strains in contaminated food
- Monitoring of bacterial growth curve
- Isolation of axenic bacteria
- UV induced mutagenesis by Physical and Chemical method
- Microbial analysis of urine and blood
- Antimicrobial assay

REFERENCES:

1. Microbiology Laboratory Manual, Vijay Nicole Publication by Dr. H. Abdul Jaffar Ali, 2018.
2. Microbiological Applications, Laboratory Manual in General Microbiology, 8th Edition by Benson.
3. Laboratory Exercise in Microbiology, 5th Edition by Harley Prescott.

CORSE CODE P8BTEP31	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – INDUSTRIAL BIOTECHNOLOGY	

Objective: To understand the Principles and Applications of Industrial Biotechnology for the Production of important Bioactive compounds.

1. **Unit 1:** General information on microbes based industries – Major classes of commercial products using microbes - enzymes, Amino acids, vitamins, Antibiotics, food and beverages.
2. **Unit 2:** Industrial uses of microorganisms - Microbes exploited commercially – Saccharomyces, lactobacillus, penicillium, acetobacter, bifidobacterium, lactococcus, streptococcus.
3. **Unit 3:** Bio reactors / Fermentor: Types, features operation sterilization, inoculation and sampling.Medium requirements for fermentation process – Carbon, Nitrogen, minerals, vitamins and other nutrients. Microbial culture – batch, fed batch semi continuous, continuous. Growth kinetics of microorganisms.
4. **Unit 4:** Downstream Process Techniques used in industrial – Fermentation, Immobilization, Centrifugation, Chromatographic Technique, Ultra Filteration, Polishing and Formulation.
5. **Unit 5:** Biofertilizers- Mass production of phosphate solubilizing bacteria. Natural bio preservatives. Mass cultivation of spirulina, Single cell protein (SCP), Improvement of nutritional value of seed storage protein. Biopolymers. Current status of industrial Biotechnology in India

Reference Books:

1. Principles of Fermentation Technology by Stanbury PF. and H whitake 1997, Aditya Books (p) ltd, New Delhi.
2. Industrial Microbiology by Prescott and Dunn.
3. Industrial Biotechnology by Casida L.E (2007), Wiley publishers.
4. Industrial Biotechnology by Patel.
5. Industrial Microbiology by F.Crueger and Anne liese Cruega (2001).

Unit - 1   Enzymes – Classification, nomenclature and General Properties of enzymes. Factors influencing Enzyme activity. Michaelis – Menten equation, different types of inhibitors.

Unit – 2 Enzymes structure, function and mechanism: Lysozyme, DNA polymerase and RNAse. Mechanism of enzyme catalysis, Role of coenzymes and metals. Regulation of enzyme activity. Allosterism, positive and negative modulations, zymogens, covalent modifications. Clinical and Industrial applications of Enzymes. Immobilizations of Enzymes and their applications.

Unit – 3 Fermentation Technology – Major types of organisms used in fermentation. Microbial growth kinetics. Types and applications, fermentation kinetics. Media for industrial fermentations – media formulation Alcoholic and Non alcoholic fermentation products.

Unit-4 Fermentation process types: Analysis of batch fed batch and continuous fermentation, stability of microbial reactors, analysis of mixed microbial populations, specialized Bioreactors (pulsed, fluidized, Photobioreactors etc).

Unit-5 Downstream processing and application of fermentation: Removal of microbial mass and solid matter. Foam separation, filtration, precipitation, centrifugation, cell disruption, liquid – liquid extraction, chromatography, membrane process, drying and crystallization.

Reference Books:
1. Lehninger, A.L., Nelson, D.L. and Cox, M.M. **Principles of Biochemistry** CBS Publishers and Distributors.
2. Trevor Palmer **Understanding Enzymes,** Second Edition, J. Wiley & Sons, New York.
3. Prescott LM, Harley JP, Klein DA. (1996) **Microbiology**, Wm. C. Brown Publishers.
4. Alba. S, Humphrey, A.E and Millis N.F. (1973) **Biochemical engineering**, Academic press, NY.
5. Atkinson B, (1974) **Biochemical Reactors,** Pion Ltd, London.
6. Stanbury P. F Whittaker A, and Hall S. J. (1995) **Principles of Fermentation Technology,** 2nd Edition, pergamon press, Oxford.
7. Jackson A.T, Prentice Hall and Engelwood Cliffs (1991) **Process engineering in Biotechnology.**
8. Nielson J, Villadsen J (1994) **Bioreactor Engineering Principles**, Plenium Press.

Objective: To better understand about the major environmental issues and biotechnological remedies.

Unit 1: **Environmental problems and monitoring**

- Current environmental problems – Ozone Depletion, Green house effects, Acid rain and Climate change.
- Environmental monitoring: environmental impacts and their assessments using bioindicators, biomarkers, biosensors and toxicity testing, rDNA technology.
- Conservation strategies.
- Environmental laws and policies in India.

Unit 2: **Bioremediation**

- Bioremediation principles.
- Strategies and techniques of bioremediation: In situ and Ex situ.
- Bioremediation of metals
- Phytoremediation
- GMOs and their impact of bioremediations.

Unit 3: **Biodegradation**

- Principles of biodegradation and mechanism of detoxification. Solid waste management.
- Biodegradation of detergent, pesticide, lignin, hydrocarbon and dyes.

Unit 4: **Biodeterioration**

- Principles and mechanisms of biodeterioration.
- Methodology to assess biodeterioation.
- Prevention and control of biodeterioration.
- Biodeterioration of selected materials.

Unit 5: **Biosafety**

- Introduction to biological safety cabinets, primary containment for biohazards, biosafety levels, biosafety levels of specific microorganisms, recommended biosafety.
- Roles of Institutional Biosafety Committee, Review Committee on Genetic Manipulation (RCGM), Genetic Engineering Appraisal Committee (GEAC) for GMO's applications in food and agriculture.
- Environmental release of GMOs, overview of national regulations and relevant international agreements - Cartagena protocol.

Reference:

1. Environmental Biotechnology – B.C. Bhattacharyya and R. Banerjee
2. Environmental Biotechnology – G.M. Evans and J.C. Furlong
3. Environmental Biotechnology – A. Scragg, Oxford
4. Environmental Microbiology-A laboratory Manual – Pepper et. al.
5. Introduction to Environmental Microbiology – Michael R.

CORSE CODE	SEMESTER-IV	Hrs\Wk: 5
P8BT4002		CREDIT: 5
	COURSE TITLE – RESEARCH METHODOLOGY	EXAM Hrs: 3

UNIT-I

Research: Basic and applied research – objectives of research – types of research – criteria of good research – hypothesisation – parameters of research - stages in the execution of research

UNIT II

Journal: Standard research journals – impact factor – citation index – information retrieval – databases – search engines – Google, PubMed NIC – network services – online data book library - format of journal – proof reading – sources of information – journals, reviews, short communication, books, monograph, Abstract and bibliography.

UNIT III

Mechanics of Dissertation writing: Spelling – punctuation – italics – names of persons – numbers – quotations – abbreviations – margins – spacing – heading – corrections – insertions - preparation of manuscript – report writing

UNIT IV

Statistical Methods: Sampling methods –variables – mean, mode, median, SD, SE, correlation & regression, t-Test, ANOVA. Statistical Tools: SSPP10. Bioinformatics Tools: BLAST, RASMOL, NCBI, EMBL & DDBT – protein sequence database – swis port and PDB

UNIT V

Biotechnological Tools: AGE, SDS-PAGE, Gel documentation – Immunotechniques – Blotting techniques – DNA finger printing – RFLP, RAPD, AFLP, PCR

REFERENCES:

1. MLA hand book for writers of research paper. Joseph Gibaldi, 6th edn. Affiliated East-West press Pvt ltd, New Delhi, India
2. Research methodology by Kothari
3. Research methodology by Gurumani
4. Writing the Doctoral Dissertation – Barrons Educational Series 2nd edn, Davis, G.B. and C.A. Parker, 1997
5. Authoring a Ph.D thesis: How to plan, draft, write and finish a doctoral dissertation, Duncary, p. 2003, Mac million Pub.
6. How to write & publish a scientific course, 5th Edn, Robert A. The Oxford Press

1. Estimation of Dissolved Oxygen.
2. Estimation of Total Dissolved Solids / Total Suspended Solids.
3. Estimation of Alkalinity / Salinity.
4. Determination of BOD / COD from sewage sample.
5. Isolation of Xenobiotics degrading bacteria – by selective enrichment technique.
6. Survey of degradative plasmids in microbes growing in polluted environment.
7. Estimation of Arsenic heavy metals in water
8. Detection of heavy metals in potable water.
9. Estimation of nitrate in drinking water.
10. Preparation and formulation of microbial biopesticide (Bacteria, Fungi and Viruses).
11. Production of microbial fertilizers (Demonstration)

Books for Reference
1. Environmental Microbiology-A laboratory Manual – Pepper et. al.
2. Introduction to Environmental Microbiology – Michael R.
3. Environmental Biotechnology – B.C. Bhattacharyya and R. Banerjee

CORSE CODE P8BTEP41	SEMESTER-IV COURSE TITLE – ENTREPRENEURIAL BIOTECHNOLOGY	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objective: The objectives of this course are to teach students about concepts of bio entrepreneurship including identifying a winning business opportunity, gathering funding and launching a business, growing and nurturing the organization and harvesting the rewards.

UNIT-I
Entrepreneur – Principles, Evolution, Concept, Functions and importance of an Entrepreneurs, Types of Entrepreneur. Development of Entrepreneurship steps in Entrepreneurial process, Role of entrepreneurs in Economic Development.

UNIT-II
Entrepreneurship in Biotechnology - Creativity & Entrepreneurial personality and Entrepreneurship in Biotechnology, pillars of bio-entrepreneurship and major start-ups in Biotechnology. Evolution of the Concept, Entrepreneurship in India, Identification of Business Opportunities.

UNIT-III

Preparation of Project Proposal - Introduction to Project, Project Identification, Project Selection, Project Report, Need and Significance of Report, Contents, formulation, Guidelines by Planning Commission for Project report, Network Analysis, Errors of Project Report, and Project Appraisal

UNIT-IV

Funding Agencies for Biotech in India - Funding of biotech business (Financing alternatives, Venture Capital funding, funding for biotech in India, Exit strategy, licensing strategies, valuation), support mechanisms for entrepreneurship.

UNIT-V

Biotechnology Enterprises - Desirables in start-up, setting up Small, Medium & Large scale industry, Quality control and Quality assurance in Biotech industries, Location of an enterprise, steps for starting a small industry, incentives and subsidies, exploring export possibilities

RECOMMENDED BOOKS

1. The Business of Biotechnology: From the Bench of the Street: By Richard Dana Ono Published Butterworth- Heinemann, 1991.
2. Entrepreneurship in Biotechnology: Managing for growth from start-up By Martin Gross Mann, 2003
3. Dynamics of Entrepreneurial Development and Management by Vasant Desai, Himalaya Publishing House, 2005.
4. Innovation and entrepreneurship in biotechnology: Concepts, theories & cases by D. Hyne & John Kapeleris, 2006
5. Entrepreneurship Development – Small Business Enterprises – Poornima M Charantimath –Pearson Education –2006, 2nd Edition.
6. Projects Planning Analysis, Selection, Implementation & Review by Prasannan.
7. Best Practices in Biotechnology Education: By Yali Friedman, Published by Logos Press, 2008.

CORSE CODE P8BTEP42	SEMESTER-IV	Hrs\Wk: 5
	COURSE TITLE – MEDICAL BIOTECHNOLOGY	CREDIT: 4
		EXAM Hrs: 3

Objective: *To impart the knowledge of biotechnological advancement in treating infectious and genetic diseases and to impart the principals involved in preparation of antibodies and vaccines.*

UNIT-I: Biotechnology in human welfare. Infectious diseases - bacterial, viral, fungal and protozoan disease, diagnosis, control and treatment. Use of nucleic acid probe and antibodies in clinical diagnostics. Application of PCR in medical diagnosis and finger printing.

UNIT – II: Gene therapy – types of gene therapy (*ex vivo* &*in vivo*). Vectors in gene therapy - retroviruses, adenoviruses & adeno-associated viruses. Epigenetic inheritance and its limitations. Antigen and antisense therapy.

UNIT-III: Methods involved in the production of Recombinant vaccines – vaccines for hepatitis B, Rabies, polio virus, foot and mouth disease, small pox virus, malaria vaccines, Tuberculosis and AIDS. Methods involved in the production of DNA and RNA vaccines.

UNIT – IV: Hybridoma technology– production of human mouse monoclonal antibodies in *E.coli*. Advantage and limitations of monoclonal antibody production. Animal cell culture – primary, secondary and continuous cell lines. Genetic engineering of animal cells and their applications. Embryonic stem cell culture and bone marrow transplantation – its Application.

UNIT-V: Methods involved in the production of recombinant hormones and its applications in human health - GH, Insulin. Transgenic animals and their applications in treating of human diseases. Artificial blood and blood component based therapy. PCR Applications and DNA finger printing.

Reference Books:
1. Biotechnology by Satyanarayana-(2010)
2. Medical microbiology Mims Play fair Roitt, wekelin Williams.-(2009)
3. Text book of Biotechnology by R. C. Dubey-(2008)
4. Immunology by Roitt- (2006)
5. Immunology by Kuby-(2003)
6. Human Genetics- Gangane –(2000)
7. Medical Physiology Guyton and Hall-(1996)

COURSE WORK

1. Projects would be allotted to III Semester students which have to be carried out and completed in Semester IV.

2. A list of projects will be finalized and announced by the Department. The students will have an option to select the project in their field of interest.

5. The project will comprise of the following:

   e. Study of background material
   f. Collection of data, procurement and fabrication of experimental set up and
   g. Writing of computer programs if needed.
   h. Giving a preliminary seminar in the III semester for the purpose of internal assessment.
   d. Writing a dissertation or project report. This will be submitted by the students at the end of IV semester.

VIVA-VOCE

The Final evaluation of the project work completed will be done by external and internal examiners appointed by the Board on the basis of an oral presentation and the submitted Project-Report.

Objectives:

The overall aim of this subject is to give the students the necessary basic information about the use of biotechnological tools in fishery and aquaculture.

A student who study this subject will be able to discuss modern advancement in fish breeding and feeds and also discuss fish health management.

Unit I:

Biotechnology in fish breeding – Transgenic fish production – Selection of fish species, gene selection, advantages and gene transfer technology – Microinjection technique, Electroporation, detection of transgenic fish by PCR - characterization of transgenic fish, potential hazards and benefits - Gonadotropin releasing hormone (GnRH).

Unit II:

Chromosome Engineering - polyploidy (triploidy and tetraploidy) and uniparental chromosome inheritance (gynogenesis and androgenesis), Genomic manipulation, hybridization, interspecific, intergeneric gynogenesis in cultured fish species.
Genetic markers: Use of biochemical and molecular genetic markers in hybridization, selective breeding. Diallele crossing: Genetic improvement of particular trait (disease resistance) in fish. Chromosome banding techniques: C-banding, G-banding, NOR-banding.

Unit III:

Feed biotechnology - Probiotics - Role of Probiotics in Aquaculture - single cell proteins - Nutraceuticals. Recombinant proteins of commercial importance: enzymes, hormones, bioactive compounds, therapeutic proteins. Anti microbial Peptides and their applications.

Unit IV:

Fish health management and **Vaccination** – shrimp sampling strategy for PCR – PCR in fish pathogenic bacterial detection - DNA vaccines, sub unit vaccines and Biofilm Vaccines. Applications of biotechnological tools: Recombinant DNA, Monoclonal antibodies, Cell lines and stem cell culture, DNA markers.

Unit V:

Disease diagnostics tools: Histopathological methods, tools used in different types of PCR, Immunoassay, Biochemical assay, Monoclonal and polyclonal based antibody assay, Electron microscopy, Serological techniques.

Reference Books:

1. Balasubramanyam, D. et al. 1998. Concepts in Biotechnology, University Press.
2. Gupta, P. K. 1999. Elements of Biotechnology, Rastogi Publications, Meerut.
3. Dunham RA. 2004. Aquaculture and Fisheries Biotechnology Genetic Approaches. CABI.

4. Glick BR & Pasternak JJ. 1999. Molecular Biotechnology: Principles and Applications of Recombinant DNA Technology. ASM Press.
5. Singh B. 2006. Marine Biotechnology and Aquculture Development. Daya Publ. House

Text Books:

1. Pandian TJ, Strüssmann CA & Marian MP. 2005. Fish Genetics and Aquaculture Biotechnology. Science Publ.
2. Pandian TJ, Strüssmann CA & Marian MP. 2005. Fish Genetics and Aquaculture Biotechnology. Science Publ.
3. Felix S. 2007. Molecular Diagnostic Biotechnology in Aquaculture. DayaPubl. House
4. Karunasagar, Aquaculture and Biotechnology
5. Ranga and Shammi. 1999. Fish Biotechnology

CORSE CODE U8CC3001	Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A.	Hrs\Wk: 7 CREDIT: 7 EXAM Hrs: 3
	COURSE TITLE- C++ & DATA STRUCTURES	

Objectives: To understand the concepts of object-oriented programming and master OOP using C++.

UNIT-I: **12 Hours**

Principles of Object Oriented Programming – Beginning with C++ – Token, Expressions and Control Structures- Functions in C++ – Classes and Objects – Constructors and Destructors.*(Chapters:1,2,3,4,5&6)*

UNIT-II: **12 Hours**

Operator Overloading and Type Conversions – Inheritance: Extending Classes – Pointers, Virtual Functions and Polymorphism - Managing Console I/O Operations. Working with Files - Templates – Exception Handling – Manipulating Strings *(Chapters: 7,8,9, 10,11,12,13&15)*

UNIT-III: **12 Hours**

Data Design & implementations: Different views of data – Abstraction and Built-in Types – Arrays

ADTs Stacks and Queue (Linear and Linked), Stack (Array and Pointer)- Applications- Infix to Postfix Conversions – Queue(Array and Pointer) – List(Array and Pointer) – Applications: (Polynomial Addition) - Doubly Linked Lists. . *(Chapter 2: Section 2.1, 2.2, Chapter 5:Section 5.1,5.2,5.3,5.4, Chapter 6: Section 6.3,6.6)*

UNIT – IV: **12 Hours**

Programming with Recursion: Recursion – Verifying and Writing Recursive Functions – **Binary Search Tree:** Implementation – Tree Traversal – **Graphs:** Implementations – BFS – DFS – Dijkstras Shortest Path Algorithm. *(Chapter 7: Section 7.1, 7.4 7.5, Chapter 8: Section 8.1, 8.4, Chapter 9: Section 9.3)*

UNIT-V:

Sorting and Searching Algorithms: Sorting – Searching – Hashing *(Chapter 10: Section 10.1, 10.2, 10.3)*   **Total : 60 Hours**

TEXT BOOK:

1. Object Oriented Programming with C++, E Balagurusamy , Tata McGraw Hill, 6th Edition, 2014.(Units I, II)

2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers , 4th Edition, 2010. (Units III, VI & V)

REFERENCES:

1. C++ The Complete Reference, Herbert Schildt, Tata McGraw Hill, 4th Edition, 2003.
2. OOP in ANSI C and Turbo C, Ashok N.Kamthene, Pearson Education, 6th Edition, 2008.
3. Data Structures and Algorithms, Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, Addison Wesley Longman Inc., 2nd Edition, 1999.

	SEMESTER-III	
CORSE CODE **U8CCPR31**	**Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A.**	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3
	COURSE TITLE- PRACTICAL III- DATA STRUCTURES USING C++ - LAB	

Objectives:
 To develop programming skills in design and implementation of data structures and their applications.

LIST OF LAB EXERCISES

1. Array implementation of Stack, Queue: Infix to postfix

2. Implementation of Stack, Queue, List, Doubly Linked List - using Pointers- Polynomial Addition

3. Implementation of Binary Search Tree, Traversal

4. Implementation of Searching and Sorting Algorithms.

5. Graph Implementation of shortest path (Djikstras)

REFERENCE :

Lab Manual

| CORSE CODE U8CCAL31 | Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A. COURSE TITLE- ALLIED- FINANCIAL ACCOUNTING I | Hrs\Wk: 7 CREDIT: 6 EXAM Hrs: 3 |

Objectives:
To inculcate basic accounting knowledge to Computer Science students

UNIT-I: 15 Hours

Introduction: Definition of Accounting – Attributes of Accounting – Book-keeping vs. Accounting – Groups Interested in Accounting Information – Methods of Accounting - Single Entry System vs. Double Entry System -Types of Accounts – Golden Rules of Accounting – Basic Accounting Concepts and Conventions- Accounting Equation – Journal – Meaning – Specimen Ruling of Journal – Construction of Journal Entries – Ledger – Meaning – Specimen Ruling of Ledger – Posting of Journal to Ledger – Balancing of Ledger Accounts – Distinction between Journal and Ledger.
(Chapter I : Sections 1.2; 1.2;1.3;1.7;1.9;1.10;1.12;2.12.1,2.18;2.19;2.23;2.24;2.26)

UNIT-II: 15 Hours

Subsidiary Books – Meaning and Purpose – Basic Documents required for Subsidiary Books – Purchase Book – Sales Book – Purchase Returns Book – Sales Returns Book – Cash Book (including Petty Cash Book) – Bills Receivable Book – Bills Payable Book – Journal Proper. Bank Reconciliation Statement – Meaning and Need – Causes of Differences in Pass Book and Cash Book – Preparation of BRS. **(*Chapter II Sections. 2.26;2.27;2.28;2.30;2.30;2.35;2.36;6.1;6.2;6.3)***

UNIT-III: 15 Hours

Trial Balance – Meaning – Objectives – Methods – Total Method – Balance Method – Schedule of Debtors – Schedule of Creditors – Preparation of Trail Balance. Errors – Types – Rectification of One-Side Errors – Rectification of Two Side Errors – Rectification through Suspense Account.
(Chapter III Sections 3.1;3.2;3.3;3.8;4.1;4.6;4.9;4.11.)

UNIT-IV: 15 Hours

Final Accounts – Meaning – Preparation of Final Accounts – Trading Account – Profit & Loss Account – Balance Sheet – Adjustment Entries. *(**Chapter IV Sections 5.1; 5.3; 5.6; 5.11; 5.13)***

UNIT-V: **15 Hours**

Partnership- Fundamentals : Definition – Partnership Deed – Rules Applicable in the absence of Partnership Deed – Necessary Adjustment of Accounts-Capital Accounts of Partners**.***(Chapter V Sections. 21.1;21.2, 21.3;21.5)*   **Total : 75 Hours**

TEXTBOOK:

Financial Accounting, T.S. Reddy & A. Murthy, Margham Publications, 7th Edition, 2014.

REFERENCES:
1. Financial Accounting , R.L. Gupta & V.K. Gupta, Sultan Chand & Sons, 8th Edition, 2010.
2. Computer Applications in Business, S.R. Srinivasa Vallabhan, Sultan Chand & Sons, New Delhi.

	SEMESTER-III	
CORSE CODE **U8CCAP31**	**Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A.**	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3
	COURSE TITLE- ALLIED PRACTICAL - ACCOUNTS I - LAB	

LIST OF EXERCISES

1. Creation of New Company, Groups, Ledger.

2. Editing and Deleting Ledgers

3. Creation and Alteration of Voucher Entries

4. Trial Balance

5. Trading , Profit and Loss Account

6. Balance Sheet

7. Bank Reconciliation Statements

8. Interest Calculation.

9. Financial Functions I in Excel.

10. Statistical Functions I in Excel.

CORSE CODE U8CC4001	Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A.	Hrs\Wk: 7 CREDIT: 7 EXAM Hrs: 3
	COURSE TITLE- PROGRAMMING IN JAVA	

Objectives:
To improve Object Oriented Programming gathered already through an independent platform.

UNIT - I: 15   Hours

OOP and Java-The Primaries – Control Statements – Arrays and Methods.
(Chapter: 1, 2, 3, 4)

UNIT - II: 15   Hours

Classes and Objects – Inheritance and Polymorphism – Interfaces and Packages-Applets.
(Chapter: 5, 6, 7, 8)

UNIT - III: 15   Hours

Abstract Windowing Toolkit-I – Abstract Windowing Toolkit-II-Swing-Exception Handling-Multi Threading.
(Chapter: 9, 10, 11, 12, 13)

UNIT - IV: 15 Hours
I/O Streams-Networking-java.lang.package-java.util.package.
(Chapter: 14, 15, 16, 17)

UNIT -V: 15   Hours

Java Database Connectivity-Servlets-Remote Method Invocation-Java Beans.
(Chapter: 18, 19, 20, 21)

TEXT BOOK
Programming with JAVA, C.Muthu, Tata McGraw Hill, 2nd Edition, 2011.

REFERENCES
1. The Complete Reference Java 2, Patrick Naughton, Herbert Schildt, Tata McGraw Hill, 5th Edition, 2006.
2. Java Programming, E. Balagurusamy, Tata McGraw Hill, 4th Edition, 2011.
3. Programming with Java, John R. Hubbard, Schaum Series, 2011

SEMESTER-IV		
CORSE CODE **U8CCPR41**	**Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A.**	Hrs\Wk: 2 CREDIT: 1 EXAM Hrs: 3
	COURSE TITLE- PRACTICAL IV- PROGRAMMING IN JAVA LAB	

List of Practicals

1. Implementation of Classes and Objects

2. Implementation of Inheritance and Polymorphism

3. Implementation of Interface and Package concepts

4. Implementation of Flow, Border ,Grid Layouts

5. Implementation of Tic-Tac Toe Application Using Applets

6. Implementation of Frames, Menus, Dialog

7. Implementation of Swing concepts

8. Implementation of Exception Handling

9. Implementation of Multi Threading

10. Implementation of I/O Streams

11. Implementation of Java Networking concepts

12. Implementation of Java Servlets (Connecting Database)

13. Implementation of RMI

14. Implementation of Java Beans

CORSE CODE U8CCAL41	Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A.	Hrs\Wk: 7 CREDIT: 6 EXAM Hrs: 3
	COURSE TITLE- ALLIED FINANCIAL ACCOUNTING II	

Objectives:
To inculcate basic accounting knowledge to Computer Science students

UNIT-I: **15 Hours**
Average Due Date: Meaning – Practical uses of Average Due Date – Determination of Due Date – Basic Problems. *(Chapter I Sections 7.1;7.2.)*

UNIT -II: **15 Hours**
Depreciation Accounting: Meaning of Depreciation – Causes of Depreciation - Methods of Providing Depreciation – Straight-Line Method – Diminishing Balance Method (Excluding Change in the Method of Depreciation) – Annuity Method. *(Chapter II Sections 11.1;11.2;11.4)*

UNIT -III: **15 Hours**
Branch Accounts: Meaning – Types of Branches – Dependent Branches Debtors System – Stock and Debtors System – Final Accounts System– Distinction between Wholesale Profit and Retail Profit – Independent branches (Foreign branches excluded). *(Chapter III Sections 16.1;16.2;16.7;16.12)*

UNIT -IV: **15 Hours**
Departmental Accounts: Meaning – Need – Distinction between Branches and Departments – Treatment of Joint Expenses –Apportionment of Expenses – Inter-Departmental Transfers at Cost Price – Inter-Departmental Transfer at Invoice Price – Treatment of Expenses which cannot be allocated.
(Chapter IV Sections 17.1-17.5)

UNIT -V: **15 Hours**
Hire Purchase System: Meaning and Legal Position – Accounting Aspects - Default and Repossession.
Installment Purchase System: Meaning and Legal position – Distinction between Hire Purchase System and Installment Purchase System- Accounting Treatment**.** *(Chapter V Sections.18.1-18.13)*

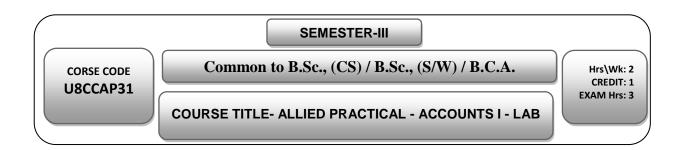   **Total : 75 Hours**

TEXT BOOK:
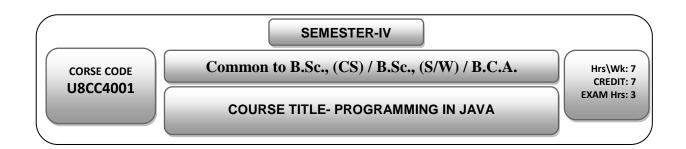Financial Accounting, T.S. Reddy & A. Murthy, Margham Publications, 7th Edition, 2014.

REFERENCES:

1. Financial Accounting , R.L. Gupta & V.K. Gupta, Sultan Chand & Sons, 8th Edition, 2010.

3. Computer Applications in Business, S.R. Srinivasa Vallabhan, Sultan Chand & Sons, New Delhi.

SEMESTER-IV		
CORSE CODE **U8CCAP41**	**Common to B.Sc., (CS) / B.Sc., (S/W) / B.C.A.** **COURSE TITLE- ALLIED - ACCOUNTS II - LAB**	**Hrs\Wk: 2** **CREDIT: 1** **EXAM Hrs: 3**

LIST OF EXERCISES

1. Cost Category & Cost Centre

2. Cost Category & Cost Centre using Class

3. Invoicing

4. Inventory & Stock.

5. Security Control

6. Bill of Material

7. Creation of Budget

8. Odoor / OpenERP

9. Financial Functions II in Excel.

10. Statistical Functions II in Excel

REFERENCE:

Lab Manual

CORSE CODE U8BC3002	SEMESTER-III	BCA	Hrs\Wk: 4
	COURSE TITLE – COMPUTER ORGANIZATION & ARCHITECTURE		CREDIT: 4 EXAM Hrs: 3

UNIT – I   15 Hours

Data Representation: Fixed point representation – Floating point representation – Alphanumeric code. **Register Transfer and Micro operation:** Register Transfer Language – Register Transfer – Arithmetic Micro operation – Logic Micro operation – Shift Micro operation – Arithmetic Logic Shift Unit. *(Chapter 3: Sections: 3.3,3.4,3.5,Chapter 4: Sections: 4.1, 4.2, 4.4, 4.5, 4.6,4.7)*

UNIT – II   15 Hours

Basic Computer Organization and Design: Instruction Codes – Timing and Control – Computer Register – Instruction Cycle – Input-Output and Interrupt. **Micro-Programmed Control:** Control Memory – Address Sequencing – Design of Control Unit. *(Chapter 5: 5.1, 5.4, 5.2, 5.5,5.7, Chapter 7: Sections: 7.1, 7.2,7.4)*

UNIT – III   15 Hours

Central Processing Unit: General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Programmed Control – Reduced Instruction Set Computer – CISC. *(Chapter 8: Sections: 8.2, 8.3, 8.4, 8.5, 8.6, 8.7,8.8)*

UNIT – IV   15 Hours

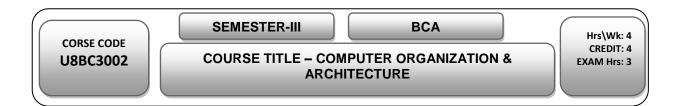**Computer Arithmetic:** Addition and Subtraction – Multiplication Algorithm – Division Algorithm – Floating-point Arithmetic operation – Decimal Arithmetic Operations. **Input Output Organization:** Peripheral Devices – Input Output Interface – Asynchronous Data Transfer – Modes of Transfer – Direct Memory Access – Input Output Processor (IOP). *(Chapter 10: Sections: 10.2, 10.3, 10.4, 10.5,10.7, Chapter 11: Sections: 11.1,11.2, 11.3, 11.4, 11.6, 11.7)*

UNIT – V   15 Hours

Memory Organization: Memory Hierarchy – Main memory – Auxiliary memory – Associative memory – Cache memory – Virtual memory. **Multiprocessors:** Characteristics of Multiprocessors – interconnection Structures. *(Chapter 12: Sections: 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, Chapter 13: Sections: 13.1, 13.2)*

Total: 75 Hours

TEXT BOOKS

1. Computer System Architecture, M. Morris Mano, Third Edition, PHI, 2007.

REFERENCE BOOKS

1. Computer Architecture and Organization, Hayes. J. P., McGraw Hill, 2009.

CORSE CODE U8BCNM31	SEMESTER-III	BCA	Hrs\Wk: 4 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – ENTERPRISE RESOURCE PLANNING		

Objectives:

To develop the knowledge of business processes. To explain about how a business works , how information systems fit into business operations and how ERP software can improve the performance of these processes.

UNIT – I: BUSINESS FUNCTION AND BUSINESS PROCESS   15 Hours

Functional areas and Business Process- Functional area of operations – Business Process – Marketing sales – Supply Chain Management – Accounting and Finance – Human Resource – Functional areas of Information System.   (*Chapter 1 : Section 1.1,1.2,1.3.)*

UNIT – II: MARKETING INFORMATION SYSTEM &SALES ORDER PROCESS IN ERP   15 Hours

Sales and Distribution in ERP – Pre Sales Activities – Sales Order Processing – Inventory Sourcing – Delivery – Billing – Payment – Customer Relationship Management – Benefits of CRM
(Chapter 3 : Section 3.4,3.5,3.6)

UNIT – III: PRODUCTION & SUPPLY CHAIN MANAGEMENT INFORMATION SYSTEMS   15 Hours

Production Overview – The Production Planning Process – The SAP ERP Approach to Production Planning – Sales Forecasting – Sales and Operation Planning – Demand Management – Material Requirement Planning in SAP ERP – ERP and Suppliers – Supply Chain
(Chapter 4 : Section 4.1,4.2,4.3,4.4.)

UNIT – IV: ACCOUNTING IN ERP SYSTEMS   15 Hours

 Accounting Activities – Using ERP for Accounting Information – Operational Decision Making problem - Credit Management – Industrial Credit Management in SAP ERP – Product Profitability Analysis – Management Reporting with ERP System – Document Flow for Customer Service
(Chapter 5 : Section 5.1,5.2,5.3,5.4,5.5)

UNIT – V: HUMAN RESOURCE PROCESS IN ERP   15 Hours

HR with ERP – Advance HR Features : Time management , Payroll , Travel management , Training and Development – Management By Objectives – ERP Process Modeling
(Chapter 6 : Section 6.3,6.4,6.5 & Chapter 7 : Section 7.2)

Total : 75 Hours

TEXT BOOK:
Enterprise Resource Planning, Ellen Monk & Bret Wagner, Cengage Learning India & Co,3rd Ed. 2009.

REFERENCES:
1. Enterprise Resource Planning, Alexis Leon, Tata McGraw Hill, 2nd Edition, 2008
2. Enterprise Resource Planning, Mary Sumner, Pearson Education, 4th Edition, 2009

CORSE CODE U8BCSB31	SEMESTER-III	BCA	Hrs\Wk: 4 CREDIT: 2 EXAM Hrs: 3
	COURSE TITLE –PRACTICAL - INTERNET LAB		

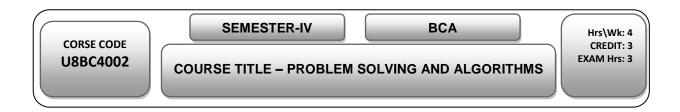**LIST OF PRACTICALS:**

1. Creation of a webpage using HTML5

2. Creation of a web page with frames, audio and video

3. Cascading Style sheet for designing the web page.

4. Design a dynamic web page using validation controls

5. Web page with Javascript

6. Web page with jQuery

7. Responsive Webpage

8. Webpage with prebuilt templates

REFERENCE:
Lab Manual

CORSE CODE U8BC4002	SEMESTER-IV	BCA	Hrs\Wk: 4 CREDIT: 3 EXAM Hrs: 3
	COURSE TITLE – PROBLEM SOLVING AND ALGORITHMS		

Objectives:

The purpose of this course is to understand simple algorithms, language constructs and to develop problem solving skills

UNIT – I   **15 Hours**
Introduction to Computer Problem Solving: The Problem Solving Aspect- Top Down Design – Implementation of Algorithms – Program Verification – The Efficiency of Algorithms – The Analysis of Algorithms. *(Chapter 1)*

UNIT –II   **15 Hours**
Array Techniques: Array Order Reversal – Array Counting or Histogramming – Finding the Maximum Number in a Set – Removal of Duplicates from an Ordered Array – Partitioning an Array, Finding the Kth Smallest element. *(Chapter 4: Sections 4.1 to 4.6)*

UNIT –III   **15 Hours**
Merging, Sorting & Searching: The Two Way Merge - Sorting by Diminishing Increment - Sorting by Partitioning- Binary Search - Hash Searching *(Chapter 5: Sections 5.1, 5.5 to 5.8)*

UNIT – IV   **15 Hours**
Text Processing & Pattern Searching: Text Line Length Adjustment – Left and Right Justification of Text – Keyword Searching in Text – Text Line Editing – Linear Pattern Search. *(Chapter 6: Sections 6.1 to 6.5)*

UNIT – V   **15 Hours**
Recursive Algorithms: Binary Tree Traversal – Recursive Quick Sort – Towers of Hanoi Problem – Sample Generations – Combination Generation – Permutation Generation. *(Chapter 8)*

TEXT BOOK:
How to solve it by Computer, R.G. Dromey, Pearson Edition, 2012

Objectives:
To provide the knowledge about commerce through electronic medium & information system.

UNIT I 15 Hours

Electronic Commerce Framework, Traditional Vs. Electronic Business Application, The Anatomy of E-Commerce Applications. Network infrastructure for E-Commerce – Components of the I-way – Global Information Distribution Networks – Public policy issues shaping the I – way. Network Access Equipment

Chapter 1 : Section 1.1,1.2,1.3 & Chapter 2 : Section 2.2,2.3,2.5,2.6

UNIT II 15 Hours

The internet as a Network Infrastructure, Network Security and Firewalls – Client Server Network Security – Firewalls and Network Security – Data and Message Security – Encrypted Documents and Electronic Mail. **(*Chapter 3 : Section 3.1 to 3.7 & Chapter 5 : Section 5.1,5.3,5.4,5.6*)**

UNIT III 15 Hours

Electronic Commerce and World Wide Web, Consumer Oriented E-Commerce, Electronic Payment Systems **(*Chapter 6 : Section 6.1,6.2, Chapter 7 : Section 7.1 & Chapter 8 : Section 8.1 to 8.6*)**

UNIT IV 15 Hours,

Electronic Data Interchange (EDI), EDI application in business, EDI and E- commerce – EDI implementation. Intra-organizational Electronic Commerce - Supply Chain Management
Chapter 9 : Section 9.1,9.2,9.4 , Chapter 10 : Section 10.2, & Chapter 11 : Section 11.1,11.5

UNIT V 15 Hours

Corporate Digital Library – Advertising and marketing on the Internet – E-Commerce Catalogs or Directories- On demand Education and Digital Copyright – Applets, Browsers & Software Agents.
Chapter 12 : Section12.1 to 12.5, Chapter 13 : Section 13.1 to 13.3 , Chapter 14 : 14.3, Chapter 15 : Section 15.1,15.2,15.3 & Chapter 16: Section 16.6.

Total : 75 Hours

TEXTBOOK:
Frontiers of Electronic Commerce, R. Kalakota and Andrew. B. Whinston, Pearson , 11th Edition , 2011.

REFERENCES:
1. Understanding Electronic Commerce, Daid Kosiur, Microsoft Press, 1997.
2. From EDI to Electronic Commerce, Soka, McGraw Hill, 1995.
3. Electronic Commerce Management, Saily Chan, John Wiley, 1998.

CORSE CODE **U8BCSB41**	**SEMESTER-IV**	**BCA**	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – PROBLEM SOLVING AND ALGORITHMS LAB		

List of Lab Exercises:

1. Implementation of Two way Merging, Binary Search, Hash Searching.
2. Implementation of Array Order Reversal.
3. Implementation of Array Counting and Histogramming.
4. Implementation of Finding Maximum and Minimum.
5. Implementation of Removal of Duplicates from an Ordered Array.
6. Implementation of Sorting by Partitioning.
7. Implementation of Combination generation.
8. Implementation of permutation generation.

CORSE CODE **P8CS3001**	**SEMESTER-III** **COURSE TITLE – DIGITAL IMAGE PROCESSING**	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objectives: To inculcate a basic training in the processing of images for practical applications in the domain of medical, remoting sessions and in general.

UNIT - I   18 Hours

Introduction: What is Digital Image Processing? – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of an Image processing System – Digital Image Fundamentals: Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationships between Pixels.

UNIT - II   18 Hours

The Image, its Mathematical Background: Overview – Linear Integral Transforms. Data Structures for Image Analysis: Level of Image Data Representation – Traditional Image Data Structures – Hierarchical Data structures. Image Pre-processing: Pixel Brightness Transformations - Geometric transformations – Local pre-processing: Image smoothing, Edge Detectors – Image Restoration.

UNIT - III   18 Hours

Segmentation : Thresholding – Edge Based Segmentation : Edge Image Thresholding, Border tracing - Region Based Segmentation – Matching – Shape Representation and Description: Region Identification – Contour Based Shape Representation and Description-Chain codes, Simple Geometric Border Representation - Region Based Shape Representation and Description, Simple Scalar Region Descriptors.

UNIT - IV   18 Hours

Object recognition: Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems- Mathematical Morphology – Basic Morphological concepts – Binary Dilation and Erosion.

UNIT - V   18 Hours

Image Data Compression: Image Data Properties – Discrete Image Transforms in Image Data Compression – Predictive Compression Methods – Vector Quantization – Hierarchal and Progressive Compression Methods – Comparison of Compression Methods – Coding –JPEG Image Compression.

Total : 90 Hours

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E.Woods, Digital Image Processing, Prentice Hall, Third Edition, 2008. (Unit-1: Chapter 1-1.1, 1.3, 1.4, 1.5, Chapter 2 -2.1, 2.2, 2.3, 2.4, 2.5).
2. Sonka, Hlavac, Boyle, Digital Image Processing and Computer Vision, Cengage Learning, 2009 (Unit -II: Chapter 3 – 3.1, 3.2 ,Chapter-4, Chapter-5,5.1, 5.2,5.3, 5.3.1, 5.3.2, 5.4
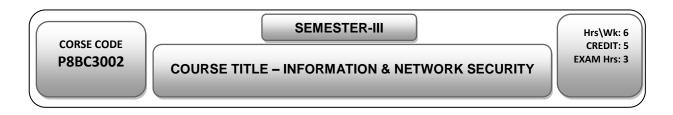Unit-III: Chapter 6 -6.1, 6.2, 6.2.1, 6.2.3., 6.3, 6.4, Chapter 8 – 8.1, 8.2,8.2.1,8.2.2, 8.3, 8.3.1
Unit-IV: Chapter 9,9.1,9.2, 9.3,9.7, Chapter 13- 13.1, 13.3
Unit-V: Chapter 14- 14.1, 14.2, 14.3, 14.4, 14.5,14.6, 14.8, 14.9,14.9.1)

REFERENCES:

1. Anil.K.Jain, Fundamentals of Digital Image Processing, Prentice-Hall, 1989.
2. Chanda & Majumdar, Digital Image Processing and Analysis, Prentice Hall, 3rdEdition

CORSE CODE P8BC3002	SEMESTER-III COURSE TITLE – INFORMATION & NETWORK SECURITY	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objectives:
To study the critical need for ensuring Information Security in Organizations

UNIT I : INFORMATION SECURITY 15 Hours

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

UNIT II : SECURITY INVESTIGATION 15 Hours

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III : SECURITY ANALYSIS 15 Hours

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV: ATTACKS, SERVICES & MECHANISMS: 15 Hours

Security attacks – Security services – Network Security Model. Conventional Encryption: Classical Techniques: Conventional Encryption model - Stenography – Classical Encryption Techniques- Modern Techniques**:** The Data Encryption Standard – The Strength of DES – Differential and Linear, Crypto-analysis.

UNIT V : PUBLIC KEY CRYPTOGRAPHY: 15 Hours

Principles of public-key cryptosystems – The RSA algorithm - Key management – Diffie-Hellman key exchange – Elliptic curve cryptography
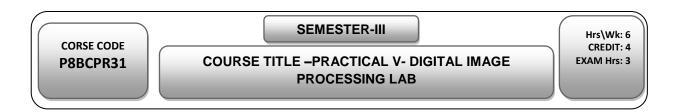
Total : 75 Hours

TEXT BOOK:

1. Principles of Information Security, Michael E Whitman and Herbert J Mattord, Vikas Publishing House, 2003   (Unit-I : Chapter 1 - 1.1,1.2,1.3,1.4,1.6,1.8,1.9) (Unit – II : Chapter 2 -2.1, 2.2,2.3,2.4 , Chapter 3) (Unit – III : Chapter 4 : 4.2, 4.3,4.4)
2. Cryptography and Network security – Principles and Practice , William Stallings, 6th Edition, Pearson Education, 2014.(Unit-IV – Page 11,32,52,57) (Unit-V – Page 244,252,277,293)

REFERENCES:

1. Handbook of Information Security Management, Micki Krause, Harold F. Tipton, Vol 1-3 CRC Press LLC, 2004.
2. Hacking Exposed , Stuart Mc Clure, Joel Scrambray, George Kurtz, Tata McGraw Hill, 2003
3. Computer Security Art and Science, Matt Bishop, Pearson/PHI, 2002.

CORSE CODE P8BCPR31	SEMESTER-III COURSE TITLE –PRACTICAL V- DIGITAL IMAGE PROCESSING LAB	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

LIST OF EXERCISES

1. Arithmetic Operation on Images

2. Bit Planes Slicing

3. Contrast Enhancement

4. Geometric Transforms

5. Low Pass and High Pass Filters

6. Quantization Reduction

7. Reading Writing Images

8. Simple Image Manipulation

9. Spatial Resolution Reduction

10. Water Marking

REFERENCE:

Lab Manual

Objectives:

To provide an exposure to current and emerging trends in computer architecture, focussing on performance and the hardware / software interfaces.

UNIT I : INSTRUCTION LEVEL PARALLELISM   18 Hours

ILP – Concepts and challenges – Hardware and software approaches – Dynamic scheduling – Speculation - Compiler techniques for exposing ILP – Branch prediction.

UNIT II : MULTIPLE ISSUE PROCESSORS   18 Hours

VLIW & EPIC – Advanced compiler support – Hardware support for exposing parallelism – Hardware versus software speculation mechanisms – IA 64 and Itanium processors – Limits on ILP.

UNIT III : MULTIPROCESSORS AND THREAD LEVEL PARALLELISM 18 Hours

Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Introduction to Multithreading.

UNIT IV : MEMORY AND I/O   18 Hours

Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time – Main memory and performance – Memory technology. Types of storage devices –Buses – RAID – Reliability, availability and dependability – I/O performance measures – Designing an I/O system.

UNIT V : MULTI-CORE ARCHITECTURES   18 Hours

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – heterogenous multi-core processors – case study: IBM Cell Processor.
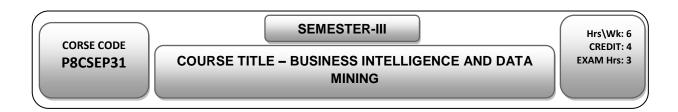
Total: 90 Hours

TEXT BOOK:

Computer architecture – A Quantitative Approach, John L. Hennessey and David A. Patterson,
 Morgan Kaufmann, Elsevier Publishers, 4th Edition, 2007.

REFERENCES:

1. Parallel computing architecture: A Hardware/Software approach David E. Culler, Jaswinder Pal Singh, Morgan Kaufmann /Elsevier Publishers, 1999.
2. Scalable Parallel Computing, Kai Hwang and Zhi.Wei Xu, Tata McGraw Hill, 2003.

CORSE CODE P8CSEP31	SEMESTER-III COURSE TITLE – BUSINESS INTELLIGENCE AND DATA MINING	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3

Objectives: To expose the students to the concepts of Data warehousing Architecture and Implementation and to Understand Data mining principles and techniques

UNIT I : DATAWAREHOUSE   **15 Hours**

Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.*(Chapter 3: Section 3.1,3.2,3.3,3.4,)*

UNIT II : DATAMINING & DATA PREPROCESSING   **15 Hours**

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation. *.(Chapter 1: Section 1.1,1.2,1.3, Chapter 2: Section 2.1,2.2,2.3,2.4,2.5,2.6)*

UNIT III : ASSOCIATION RULE MINING   **15 Hours**

Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining. *.(Chapter 1: Section 1.4, Chapter 5: Section 5.1,5.2, 5.3, 5.5)*

UNIT IV : CLASSIFICATION & PREDICTION   **15 Hours**

Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.*(Chapter 6: Section 6.1 to 6.15)*

UNIT V : CLUSTERING   **15 Hours**

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data –

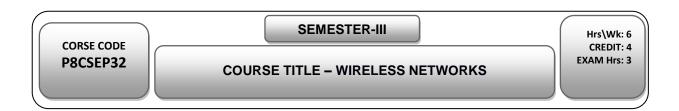Constraint-Based Cluster Analysis – Outlier Analysis.*(Chapter 7: Section 7.1to 7.11)*

Total : 75 Hours

TEXT BOOK:

Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Elsevier, 2nd Edition, Reprinted 2008.

REFERENCES:

1. Data Warehousing, Data Mining, and OLAP , Berson,Alex & Smith, Stephen J, Tata McGraw Hill, 2012
2. Insight into Data mining Theory and Practice, K.P. Soman, Shyam Diwakar and V. Ajay, Easter Economy Edition, Prentice Hall of India, 2006.
3. Introduction to Data Mining with Case Studies, G. K. Gupta Easter Economy Edition, Prentice Hall of India, 2006.
4. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach and Vipin Kumar Pearson Education, 2007

CORSE CODE P8CSEP32	SEMESTER-III	Hrs\Wk: 6 CREDIT: 4 EXAM Hrs: 3
	COURSE TITLE – WIRELESS NETWORKS	

OBJECTIVES:
To study about Wireless networks, protocol stack, standards, fundamentals of 3G Services, its protocols and applications, evolution of 4G Networks, its architecture and applications.

UNIT   I WIRELESS LAN
Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum - IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security – IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX.

UNIT   IIMOBILE NETWORK LAYER
Introduction – Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol – mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing.

UNIT III MOBILE TRANSPORT LAYER
TCP enhancements for wireless protocols – Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility – Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP – TCP over 3G wireless networks**.**

UNIT IVWIRELESS WIDE AREA NETWORK

Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.
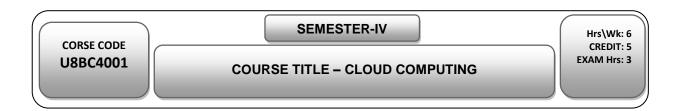
UNIT V4G NETWORKS

Introduction – 4G vision – 4G features and challenges – Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg , "Wireless Communications and networking", First Edition, Elsevier 2007.(Unit IV,V)

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011.
3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications",

CORSE CODE U8BC4001	SEMESTER-IV COURSE TITLE – CLOUD COMPUTING	Hrs\Wk: 6 CREDIT: 5 EXAM Hrs: 3

Objectives:

To introduce the concepts of cloud and related terms and various cloud services present currently.

UNIT – I: BASIC TERMINOLOGY   **18 Hours**

Cloud Computing Introduction, From, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

UNIT – II: CLOUD COMPUTING FOR EVERYONE   **18 Hours**

Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping schedulesm managing projects, presenting on road.

UNIT – III: USING CLOUD SERVICES   18 Hours

Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets, and databases.

UNIT – IV: OUTSIDE THE CLOUD   18 Hours

Evaluating web mail services, evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis

UNIT – V: STORING AND SHARING   18 Hours

Understanding cloud storage, evaluating on line file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.

Total : 90 Hours

TEXT BOOK:

Cloud Computing, Michael Miller, Pearson Education, New Delhi, 2009

REFERENCES:

Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education, 2013

Objectives: To provide an introduction to the system software like assemblers, compilers and macros. It provides the complete description about inner working of a compiler.

UNIT I : LEXICAL ANALYSIS   18 Hours

Introduction to Compiling- Compilers-Analysis of the source program-The phases- Cousins-The grouping of phases-Compiler construction tools. The role of the lexical analyzer- Input buffering-Specification of tokens-Recognition of tokens-A language for specifying lexical analyzer.
(Chapter 1: Section 1.1, 1.2, 1.3,1.4,1.5,1.6,1.7, Chapter 2: Section 2.1,2.3,2.42.5,2.6,2.10)

UNIT II : SYNTAX ANALYSIS and RUN-TIME ENVIRONMENTS   18 Hours

Syntax Analysis- The role of the parser-Context-free grammars-Writing a grammar-Topdown parsing-Bottom-up Parsing-LR parsers-Constructing an SLR(1) parsing table. Type Checking- Type Systems-Specification of a simple type checker. Run-Time Environments-Source language issues-Storage organization-Storage-allocation strategies.
(Chapter 3: Section 3.1,3.2,3.5,3.3, Chapter 4: Section 4.2,4.5 Chapter 8: Section 8.2,8.3,8.4)

UNIT III : INTERMEDIATE CODE GENERATION   18 Hours

Intermediate languages-Declarations-Assignment statements - Boolean expressions- Case statements- Backpatching-Procedure calls
(Chapter 5: Section 5.2,5.3,5.4,5.5,5.6,5.7,5.8)

UNIT IV : CODE GENERATION   18 Hours

Issues in the design of a code generator- The target machine-Run-time storage management-Basic blocks and flow graphs- Next-use information-A simple code generator-Register allocation and assignment-The DAG representation of basic blocks - Generating code from DAGs.
(Chapter 6: Section 6.2,6.3,6.4,6.5,6.6,6.7,6.8)

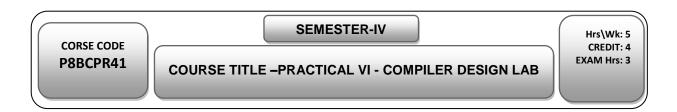## UNIT V : CODE OPTIMIZATION   18 Hours

Introduction-The principle sources of optimization-Peephole optimization- Optimization of basic blocks-Loops in flow graphs- Introduction to global data-flow analysis-Code improving transformations.
(Chapter 7: Section 7.1,7.2,7.3,7.4,)   **Total: 90 Hours**

TEXT BOOK:

Compiler Design, Dr. R. Venkatesh, Yes Dee Publishing pvt. Ltd, 2015

REFERENCES:

1. Modern Compiler Design, David Galles, Pearson Education Asia, 2007

2. Advanced Compiler Design & Implementation, Steven S. Muchnick, Morgan Kaufmann Pulishers, 2000. 3. Crafting a Compiler with C, C. N. Fisher and R. J. LeBlanc, Pearson Education, 2000.

CORSE CODE P8BCPR41	SEMESTER-IV COURSE TITLE –PRACTICAL VI - COMPILER DESIGN LAB	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

LIST OF EXERCISES

1. Construction Of NFA

2. Construction Of Minimized DFA

3. Implementation Of Lexical Analyser Using Lextool

4. Implementation Of Symbol Table

5. Construction Of Operator Precedence Parse Table

6. Syntax Analysis Using YACC

7. Implementation Of Shift Reduce Parsing Algorithm

8. Construction Of LR Parsing Table

9. Implementation Of Intermediate Code Generation

10. Implementation Of Code Optimization Techniques

11. Conversion Of Infix To Postfix Expression

12. Implementation Of Quadraples

13. Implementation Of Triples

14. Generation Of Tokens For Given Lexeme

15. Parsing The String

REFERENCES:
Lab Manual

1. Mini projects would be allotted to IV Semester students which have to be carried out by them
2. The studentswillsubmitthe title of the miniproject in their field of interest.
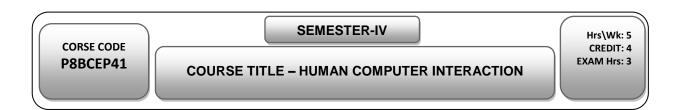
   The project will comprise of the following:

   a. Study of background material
   b. Collection of data, procurement and fabrication of experimental set up and Writing of computer programs and alogorithms.
   c. Giving a preliminary seminarfor the purpose of internal assessment.
   d. Writing a dissertation or mini project report. This will be submitted by the students at the end of semester.

VIVA-VOCE

The Final evaluation of the mini project work completed will be done by external and internal examiners appointed by the Board on the basis of an oral presentation andthe submitted Project-Report.

CORSE CODE P8BCEP41	SEMESTER-IV COURSE TITLE – HUMAN COMPUTER INTERACTION	Hrs\Wk: 5 CREDIT: 4 EXAM Hrs: 3

Objectives :
To enable students to understand the various meanings of usability and how to build
usability in products, product interfaces and product information.

UNIT - I   **12 Hours**
The Importance of user Interface-Defining the User Interface, The importance of Good Design , The Benefits of good design, A brief History of Screen design. **Characteristics of Graphical and Web User Interfaces-** The Graphical User Interface, The popularity of graphics, The Concept of Direct Manipulation. Graphical system: Advantages and Disadvantages , Characteristics of the Graphical User Interface, The Web User Interface – The Popularity of the Web- Characteristics of a Web Interface- Principles of User Interface Design.**(Part 1, Chapter 1 & 2)**

UNIT - II   **12 Hours**

The User Interface Design Process – Understanding How People Interact with computers – Important Human Charactersitics in Design- Human Considerations in Design- Human Interaction Speeds- Understanding Business Functions. **(Part 2, Step: 1 & 2)**

UNIT - III   **12 Hours**

Understand the Principles of Good Screen Design: Interface Design Goals – Screen Meaning and Purpose- Organizing Screen Elements Clearity and Meaningfully- Ordering of Screen Data and Content – Screen Navigation and Flow – Visually Pleasing Composition – Amount of Iinformation – Focus and Emphasis – Presenting Information Simply and Meaningfully – Reading, Browsing, and Searching on web- Statistical Graphics – Technological Consideration in Interface Design. **(Part 2:Step : 3)**

UNIT - IV   **12 Hours**

Development System Menus and Navigation Schemes- Select the Proper Kinds of Windows- Select the Proper Device Based Controls- Choose the Proper Screen Based Controls-Write Clear Text and Messages- Create Meaning ful Graphics- Icons and Images- Choose the Proper Colors: Color- Color Uses- Possible Problems with Color-Choosing Colors.**(Part 2: Step: 4,5,6,7,8,11,12)**

UNIT - V   **12 Hours**

Software Tools – Specification Methods, Interface – Building Tools. **(Part II: Chapter: 5)**
Interaction Devices: Introduction- Keyboards and Keypads- Pointing Devices- Speech and Auditory Interfaces- Displays Small and Large.**(Part III: Chapter:9)**
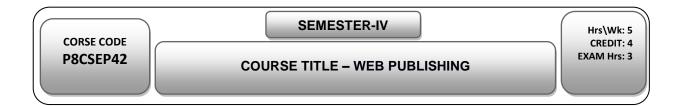
                                                                                Total : 60 Hours

TEXT BOOKS:
 1. The Essential Guide to User Interface Design, Second Edition, Wilbert O Galitz, Wiley India Edition. **(Unit: I,II,III,IV)**
 2. Designing the User Interface, Ben Shneidermann, Pearson Education Asia, 4rd, Edition, 2005**. (Unit: V)**

REFERENCES:

1. Human – Computer Interaction, Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson.
2. Interaction Design, Prece, Rogers, Sharps. Wiley Dream Tech,
3. User Interface Design, Soren Lauesen, Pearson Education.

Unit I:

Exploring the PHP Environment, Special Topic – Uploading to ShawneeSpace Server - Using Variables and Input– Controlling Your Code with Conditions andFunctions - Create Web home pages and sites- Identify the terms, concepts and components used in the internet and Web environment.

Unit II:

Loops and Arrays, Better Arrays and String HandlingWorking With FilesWriting Programs with ObjectsReview and Slack DayRegular expressions, data validation.Create publications for the Internet incorporating graphics such as GIF and JPEG.Work online with computer software programs such as Dreamweaver.Create hyperlinks between pages, documents and other sites.

Unit III:

Connecting to a database with PDOError controlConnecting to a database with PDO (part 2)Security and SQL Injection - Create images and make them serve as hyperlinks.Create tables.Create framed documents.Create image maps.
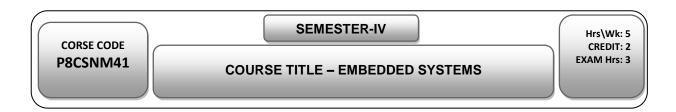
Unit IV:

XML using simpleXMLHandling AJAX requests Graphic Manipulation using the GD libraryCreating dynamic PDF documents using FPDF. Learn XHTML & CSS - Slice and export images Photoshop - XHTML/CSS -Slicing in Photoshop then export -Double Identity website project.

Unit V:

Link to external CSS - Learn DIVs -one background image repeated horizontally (repeat-x)Link to ext CSS - Make DIVs - Double Identity website project - Troubleshoot Double Identity website project - Make a website graphic in Photoshop - 5-8 page navigation -Logo, banner, body content, footer

TEXT BOOK:

1. Duckett, John (2011). HTML & CSS: Design and build websites. Indianapolis, Indiana: John Wiley and Sons, Inc.

Objectives :
To learn the method of designing real time systems.

UNIT I : EMBEDDED COMPUTING   **12 Hours**
Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.

UNIT II : MEMORY AND INPUT / OUTPUT MANAGEMENT   **12 Hours**
Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupts handling.

UNIT III : PROCESSES AND OPERATING SYSTEMS   **12 Hours**
Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.

UNIT IV : EMBEDDED SOFTWARE   **12 Hours**
Programming embedded systems in assembly and C – Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers.

UNIT V : EMBEDDED SYSTEM DEVELOPMENT   **12 Hours**
Design issues and techniques – Case studies – Complete design of example embedded systems.

                                                    Total : 60 Hours

TEXT BOOKS:

1. Computers as Components: Principles of Embedded Computer System Design , Wayne

Wolf, Elsevier, 2006.

2. Embedded C, Michael J. Pont, Pearson Education, 2007.

REFERENCES:

1. Embedded System Design, Steve Heath, Elsevier, 2005.

2. The 8051 Microcontroller and Embedded Systems , Muhammed Ali Mazidi, Janice

Gillispie Mazidi and Rolin D. McKinlay, Pearson Education, 2nd edition, 2007.

M.Phil Syllabi

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8HI01	

COURSE OUTCOMES	
CO 1	The scholars acquire skills regarding the different trends and methods in Research and emulate an ethical approach to Research.
CO 2	The scholars are empowered with the ability to identify and formulate the research problem.
CO 3	The scholars obtain the ability to collect data from different source repositories
CO 4	The scholars attain the attributes to effectively analyse the collected in an objective manner.
CO 5	The scholars get the ability to successfully document their findings.

Objectives:

1. *To introduce the scholars to the latest trends of research methodology*
2. *To promote a spirit of inquiry among the scholars*
3. *To inform the scholars about various sources and methods of Data Collection*
4. *To train the scholars to analyse and document the data*

Unit - I: Trends In Methodology: Scientific Method as applied in History- Heuristics Hermeneutics – Quantitative and Qualitative Methods – Textual Analysis – Oral Traditions Semiotics and Studies of Symbols – Inter – Disciplinary Approaches

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

Unit - II: Research Process: Problems in Existing Research – Selection of Topic – Feasibility – Methods of authentication – Research Plan and Working Hypothesis

Unit - III: Data Collection: Sources – Repositories of Sources – Libraries and Archives – Digital Information – Possibilities of field Research – Data Arrangement – Manual Card system – Word Processor – Files and Folders

Unit - IV: Data Analysis: Source Analysis – Content Analysis- Objectivity and Bias reasoning – Fallacies- Generalizations and Explanations – Ordering of the Data – Conceptual Linkages – Method of Explanation - Verification of Hypothesis – Formulation of the final argument

Unit - V: Documentation: Chapterisation – Logical Arrangement of chapters – Citations – Acknowledgement of sources – References and functions of Bibliography – Use of Tables, Charts and Maps –Analytical Writing – Language – Need for consistency and terminological clarity – Glossary and Index

Books for Study:

1. Kate Turabian: A manual for the writers of term papers, theses and dissertations
2. William Good and Paul Hatt : The methods of Social Research
3. March Bloch: The Historians Craft.

Books for Reference:

1. Roderick Floud, An Introduction to Quantitative Methods for Historians, London,1993
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Malcolm Williams, Science and Social Science: An Introduction, London, New York and Routledge, 2000
4. M.L.A. Hand Book for Researchers Thesis & Assignment Writing Wily Eastern, New Delhi, 1990.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	HISTORIOGRAPHY	Exam Hrs.	3
		MPH8HI02	

CORE PAPER II	SEMESTER I	Credit	5
		Hrs/ Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8H102	
COURSE OUTCOMES			
CO 1	The scholars identify the nature and functions of History		
CO 2	The scholars understand the intimacy of History with other disciplines.		
CO 3	The scholars comprehend the value of History and recognise how History can be misused.		
CO 4	The scholars realise the evolution of Historical Writing from earliest days to medieval period.		
CO 5	The scholars recognise the recent trends in Historical Writing.		

Objectives:

1. *To introduce the scholars the nature and scope of History*

2. ***To relate the connectivity between History and other disciplines***
3. ***To study the use and abuse of History***
4. ***To study the various trends of Historiography***

Unit - I: Introduction: Definition, Nature, Scope, Functions

Unit - II: History and Allied Disciplines: Economics, Sociology, Geography, Literature and Auxillary Sciences

Unit - III: Value and Subject matter of History: Use and abuse of History, History Art or Science

Unit - IV: Early Trends: Greco-Roman- Ancient Indian-Medieval, Church and Arab-Enlightenment

Unit - V: Modern Trends: Romanticist – Scientific theory-Materialist theory – Structuralism – Poststructuralism-post modernism

Books for Study:

1. E.H. Carr: What is History

2. R.G. Collingwood: The Idea of History

3. B.Sheikh Ali: History its theory and Method

Books for Reference:
1. Harvey kay, The British Marxist Historians (Polity)
2. Stein, Burton, History of India
3. Champakalakshmi, R. Trade, Ideology and Urbanization: South 300 B.C. to A.D 1300

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8CO01	

Objective: To infuse research flair among research scholars by developing their research aptitude.

UNIT – I: Introduction   (18 Hours)

Meaning of Research and Scope of Research Methodology – Stakeholders of Social Research – Significance of Research in Social Science – Identification of Research

Problem – Formulation of Research Questions – Pilot Study – Meaning and Components of Research Design – Review of Literature (Theory only)

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT – II: Hypothesis   (18 Hours)

Hypothesis – Meaning and role – Structure – Relationship between variables – Types – Strong and Weak – Sampling Theory – Sampling Methods and Techniques – Sampling size – Sampling error(Theory only)

UNIT – III: Data Collection   (18 Hours)

Data Collection – Sources – Primary and Secondary – Data matrix – Unit of data collection – Methods and tools of data collection – Interview and questionnaires and their types – Scaling and Testing Techniques – Reliability and validity of instruments – Uses of Information Technology in data collection (Theory only)

UNIT – IV: Data Analysis   (18 Hours)

Data Analysis – Analysis of quantitative data – Descriptive statistics – Test of significance – Parametric tests and non-parametric test – Chi-square Test – ANOVA test – Interpretation – Application of SPSS for Data Analysis (Both Theory & Problems)

UNIT – V: Report Writing   (18 Hours)

Report writing – Significance of report writing – Different steps in writing report – Layout of Research Report – Types – Technical report – Popular report – Mechanics of writing a report (Theory only)

Weightage of marks: Theory 50 marks & Problem 25 marks

Reference Books:

1. R. Kothari, Research Methodology, Methods and Techniques, Wiley Eastern Ltd. New Delhi.

2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010

3. D. Amarchand, Research Methods in Commerce, Emerald Publishers, Chennai.

4. R. L. Anderson., H. D. Berry., M. Poole, Thesis and Assignment Writing, Wiley Eastern Ltd.,New Delhi.

5. H. Bernard Russel, Social Research Methods (London: Sage)

6. S. P. Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED FINANCIAL MANAGEMENT	Exam Hrs.	3
		MPH8CO02	

Objective: To enhance the ability of research scholars in analysing and managing the financial aspects of an organisation.

UNIT – I: Introduction   (15 Hours)

Financial Management – Meaning, scope, objectives and functions – Relationship between financial management and other areas of management. (Theory only)

UNIT – II: Accounting Ratios   (15 Hours)

Accounting Ratios – Classification of Ratios – Profitability – Turnover – Financial – Advantages and limitations – Interpretation of results – Intra Firm Comparisons. (Both Theory and Problem)

UNIT – III: Capital Structure   (15 Hours)

Capital Structure – Meaning – Theories of Capital Structure – Net Income Approach - Net Operating Income Approach – MM Approach and Traditional Approach (Both Theory and Problem)

UNIT – IV: Capital Budgeting   (15 Hours)

Capital Budgeting – Meaning, Importance, Kinds of capital investment proposals – Factors affecting capital investment decisions – Capital budget appraisal methods (Both Theory and Problem)

UNIT – V: Working Capital Management   (15 Hours)

Working Capital Management – Meaning, need and types of working capital – Sources of working capital – Determinants of working capital needs. (Both Theory and Problem)

Weightage of marks: Theory 50 marks & Problem 25 marks

Reference Books:

1. I.M. Pandey, Financial Management, Vikas Publishing House, New Delhi.
2. S.N. Maheswari, Fundamentals of Financial Management, Sultan Chand & Sons, New Delhi.
3. Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw Hill Publishing Company, New Delhi.
4. M.Y. Khan and P.K. Jain, Financial Management, Tata McGraw Hill Publishing Company Limited. New Delhi.
5. P.V.Ratnam, Financial Management Theory, Problems and Solutions, Kitab Mahal,New Delhi.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ALGEBRA AND ANALYSIS	Exam Hrs.	3
		MPH8MS01	

- To learn Moral Justification of Research, Information & communication technology issues and code of ethics.
- To study rings, nilpotent elements, direct sum and tensor product of algebras.
- To acquire the knowledge of ideals in rings of fractions and primary decomposition.
- To understand the concept of measurability and L^p spaces.
- To learn concept of Fourier transforms in various spaces.

UNIT– I :

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

RINGS, IDEAL AND MODULES

Rings and ring homomorphisms – Ideals, Quotient rings – Zero divisors, Nilpotent elements, Units – Prime ideals and maximal ideals – Nilradical and Jacobson radical – Operations on ideals – Extension and contraction – Exercise – Modules and module homomorphisms – Submodules and quotient modules – Operations on submodules – Direct sum and product – Finitely generated modules – Exact sequences – Tensor product of modules – Restriction and extension of scalars – Exactness properties of the tensor product – Algebras – Tensor product of algebras – Exercises.

Chapter 1: (pp. 1 – 10)

Chapter 2: (pp. 17 – 31).

UNIT–II: RINGS, MODULES OF FRACTIONS AND PRIMARY DECOMPOSITION

Local properties – Extended and contracted ideals in rings of fractions – Exercise – Primary Decomposition – Exercise.

Chapter 3: (pp. 36 – 43)

Chapter 4: (pp. 50 – 55).

UNIT–III: CHAIN CONDITIONS, NOETHERIAN RINGS AND ARTIN RINGS

Chain conditions – Exercises – Primary Decomposition in Noetherian rings – Exercises – Artin Rings – Exercises.

Chapter 6: (pp. 74 – 78)

Chapter 7: (pp. 80 – 84)

Chapter 8: (pp. 89 – 91).

UNIT– IV : ABSTRACT INTEGRATION AND L^p SPACE

The concept of measurability – simple functions – Elementary properties of measures integration of positive functions – Integration of complex functions – The role played by sets of measure zero – Convex functions and inequality – L^p spaces.

Chapter 1: (pp. 5 – 31)
Chapter 3: (pp. 61 – 69).

UNIT – V: FOURIER TRANSFORMS AND HOLOMORPHIC FOURIER TRANSFORMS

Formal properties – The Invention Theorem – The Plancheral Theorem – The Banach algebra L^1 – Introduction – Two Theorems of Paley and Wiener Quasi – Analytic classes – The Denjoy – Carleman theorem.

Chapter 9: (pp. 178 – 193)
Chapter 19: (pp. 371 – 383).

Content and Treatment as in:

1. INTRODUCTION TO COMMUTATIVE ALGEBRA, *M.F. Atiyah and I.G. Macdonald*,(1969), Addison – Wesley.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. REAL AND COMPLEX ANALYSIS, (Third Edition), *Walter Rudin*, (1986), McGraw Hill.

References:

1.   ABSTRACT ALGEBRA, *R.S. Pierce*, Springer Verlag.
2.   REAL ANAYLSIS, *R.G. Bartle*, (1976), John Wiley and Sons.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	TOPOLOGY AND DIFFERENTIAL EQUATIONS	Exam Hrs.	3
		MPH8MS02	

- To understand concept in algebraic structures of topological spaces.
- To know structure of the fundamental groups of a simplicial complex.
- To acquire the knowledge the stability of the dynamical system using stability manifold theorems.

UNIT – I: FUNDAMENTAL GROUP AND COVERING SPACES

Homotopy – Fundamental group – Covering spaces.

Chapter 3: (pp. 49 – 77)

UNIT – II: SIMPLICIAL COMPLEXES

Geometry of simplicial Complexes – Bary centric subdivisions – simplicial approximation Theorem – Fundamental Group of a simplicial complex.

Chapter 4: (pp. 78 – 108)

UNIT – III: LINEAR SYSTEMS

Uncoupled Linear system – Diagonalization – Exponential operators – The Fundamental Theorem for linear system – Linear system in R^2 – Complex Eigen Values – Multiple Eigen Values – Non Homogeneous Linear System.

Chapter 1: Sections 1.1 to 1.7 and 1.10 (pp. 1 – 39, 60 – 63)

UNIT – IV: NONLINEAR SYSTEMS: LOCAL THEORY

Some preliminary concepts & definitions – The Fundamental Existence – Uniqueness Theorem – Dependence on initial conditions and parameters – The Maximum interval of Existence – The Flow defined by a Differential Equation.

Chapter 2: Sections 2.1 and 2.5 (pp. 65 – 101)

UNIT – V: NONLINEAR SYSTEMS

Linearization – The Stable Manifold Theorem – Dynamical Systems and Global Existence Theorems – Limits Sets and Attractors.

Chapter 2: Sections 2.6 and 2.7 (pp. 101 – 118)

Chapter 3: Sections 3.1 and 3.2 (pp. 181 – 199)

Content and Treatment as in :

1. LECTURE NOTES ON ELEMENTARY TOPOLOGY AND GEOMETRY, *I.M. Singer and J.A. Thorpe*, (1967), Springer Verlag, New York.

2. DIFFERENTIAL EQUATION AND DYNAMICAL SYSTEM, *L. Perko*, (2006), Third Edition, Springer Verlag, New York.

References:

1. INTRODUCTION TO TOPOLOGY AND MODERN ANALYSIS, *G.F. Simmons*, (1963), Mcgraw Hill.

2. COUNTER EXAMPLES IN TOPOLOGY, *L. Sten and J. Subash*, Holt, RineHart and Winston.

3. ADVANCED DIFFERENTIAL EQUATIONS, *M.D. Raisinghania*, (2001), S. Chand & Co., New Delhi.

SEMESTER – I

Elective		
Theory	**PROBABILITY MODELS AND APPLICATIONS**	Hrs/Week
Paper – EC01		Credit

UNIT – I: INTRODUCTION TO PROBABILITY THEORY

Introduction – Sample space and Events – Probability defined on events – Conditional probabilities – Independents – Baye's formula.

RANDOM VARIABLES

Random variables – Discrete and Continuous Random variables – Expectation of a random variable – Limit Theorems – Stochastic Process.

UNIT – II: CONDITIONAL PROBABILITY AND CONDITIONAL EXPECTATION

Introduction – The discrete case – The Continuous case – Computing expectations by conditioning – Computing probabilities by conditioning – Some applications.

THE EXPONNENTIAL DISTRIBUTION AND THE POISSON PROCESS

Introduction – The Exponential distribution – The Poisson process – Generalizations of the Poisson process.

UNIT – III: RENEWAL THEORY AND ITS APPLICATIONS

Introduction – Distribution of N(t) – Limit theorems and their applications – Renewal Reward process – Regenerative process – Computing the renewal function – Application of patters.

UNIT – IV: PARAMETRIC FAMILIES OF DISTRIBUTIONS OF DIRECT IMPORTANCE IN RELIABILITY THEORY

A notation of aging – The exponential distribution – The poisson process – The poisson distribution – Parametric families of the life distributions – with monotone failure rate.

UNIT – V: CLASS OF LIFE DISTRIBUTION BASED O NOTATION OF AGING

Introduction – distribution with IFRA arising from shock models – Preservation of life distribution classes under reliability operations – Partial orderings of life distributions – Reliability bounds – Mean life of series and parallel systems.

Content and treatment as in:

1. INTRODUCTION OF PROBABILITY MODELS, *Sheldon M. Ross*.
2. STATISTICAL THEORY OF RELIABITY AND LIFE TESTING MODELS, To Begin With *R.E. Barlow and F. Proshan*, (1975).

References:

1. PROBABILITY THEORY AND MATHEMATICAL STATISTICS, *M. Fisz*, (1963), John Wiley and Sons, New York.
2. STOCHASTIC PROCESSES, *Sheldon M. Ross*, (2001).

SEMESTER – I

Elective		
Theory	**BANACH ALGEBRA**	Hrs/Week
Paper – EC02		Credit

UNIT – I: FINITE DIMENSIONAL SPECTRAL THEORY:

Matrices – Determinants and the spectrum of an operator – The spectral theorem – A survey of the situation.

Chapter 11: (pp. 278 – 297)

UNIT – II: BANACH ALGEBRA:

The definition and some examples – Regular and singular elements –Topological divisors of zero – The spectrum – The formula for the spectral radius – The radial and semi – simplicity.

Chapter 12: (pp. 301 – 311)

UNIT – III: BANACH ALGEBRA:

The Gelfand mapping – Application of the formula $r(x) = \lim \left\| x^n \right\|^{1/n}$ – Involution in Banach algebras – The Gelfand–Neumark theorem.

Chapter 13: (pp. 318 – 325)

UNIT – IV: COMMUTATIVE BANACH ALGEBRA:

Ideal in $c(x)$ and the Banach stone theorem – The Stone cech compactification (continued) – Commutative C* – Algebra

Chapter 14: (pp. 327 – 332)

Content and Treatment as in :

1. TOPOLOGY AND MODERN ANALYSIS, *G.F. Simmons*, (1963), McGraw Hill.

References:

1. FUNCTIONAL ANALYSIS, *W. Rudin*, (1973), Mcgraw Hill, New Delhi.
2. FUNCTIONAL ANALYSIS, *G. Bauhman and L. Narici*, (1966), Academic press, New Delhi.

Elective		
Theory	**FUZZY SETS AND THEIR APPLICATIONS**	Hrs/Week
Paper – EC01		Credit

UNIT – I : FUZZY SETS

Fuzzy sets – Basic concepts – Characteristics – significance of the paradigm shift – Additional properties of – Cuts.

Chapter 1: Sections 1.3 to 1.5

Chapter 2: Sections 2.1

UNIT – II : FUZZY SETS VERSUS CRISP SETS

Representation of Fuzzy sets – Extension principle of Fuzzy sets – Operation on Fuzzy sets –Types of Operation – Fuzzy complements.

Chapter 2: Sections 2.2 to 2.3

Chapter 3: Sections 3.1 to 3.2

UNIT – III : OPERATIONS ON FUZZY SETS

Fuzzy intersection – t–norms, Fuzzy unions – t–conforms – Combinations of operations –

Aggregation operations.

Chapter 3: Sections 3.3 to 3.6

UNIT – IV : FUZZY ARITHMETIC

Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Lattice of Fuzzy numbers

Chapter 4: Sections 4.1 to 4.4

UNIT – V : CONSTRUCTION FUZZY SETS

An overview – Direct methods with one expert – Direct methods with multiple experts –

Indirect method with multiple experts and one expert – Construction from sample data.

Chapter 10: Sections 10.1 to 10.7

Content and Treatment as in:

FUZZY SETS AND FUZZY LOGIC: THEORY AND APPLICATIONS, *G.J. Klir, and Bo Yuan*, Prentice Hall of India Ltd, New Delhi, 2005.

References:

1. FUZZY SET THEORY AND ITS APPLICATIONS, *H.J. Zimmermann*, Allied Publishers, Chennai, 1996.
2. INTRODUCTION TO THE THEORY OF FUZZY SUBSETS, *A. Kaufman*, Academic Press, New York.
3. FUZZY SETS AND THEIR APPLICATION, *V. Novak*, Adam Hilger, Bristol, 1969.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8PY01	

Course Learning Outcomes:

➢ research, ethical vetting, and scientific misconduct.

➢ Develop awareness onethically use, document and integrated sources for logical format of writing thesis, paper and drafting report.

The aim of the course is to provide participants with an introduction to research methods and report writing. Upon successful completion of the course you are expected to

➢ Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.

➢ Develop skills on qualitative and quantitative research data analysis and presentation.

➢ Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis

➢ Have basic awareness of data analysis-and hypothesis testing procedure.

➢ know the various funding agencies for research in India.

   acquire an overview of important issues in research ethics, like responsibility for

UNIT – I: RESEARCH METHODOLOGY

Meaning of research – Objectives of research – motivation of research – Types, approaches and significance – Methods versus methodology – Research in scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT – II: RESEARCH DESIGN

Research Problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and feature of good design – Different research design – Basic principles of experimental design.

UNIT – III: DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types – Processing and presentation of data – Techniques of ordering data – Meaning of primary and secondary data – The uses of computers in research – The library and internet – Uses of search engines – virtual libraries - common software for documentation and presentation.

UNIT – IV: DATA AND ERROR ANALYSIS

Statistical analysis of data – standard deviation – Correlation – Comparison of sets of data – Chi squared analysis for data – Characteristics of probability distribution – Binomial, Poisson and normal distribution – Principle of least square fittings – Curve fitting – Measurement of errors – Types and souces of errors – Determination and control errors.

UNIT – V: RESEARCH COMMUNICATION

Meaning of research report – Logical format for writing thesis and paper – Essential of scientific report: abstract, introduction, review of literature, materials and methods and discussion – Write up steps in drafting report – Effective illustrations: tables and figures – Reference styles : Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research Methodology, Methods and techniques – C.R. Kothari – Wishwa Prakasam Publications, II Edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research: An introduction – Robert Ross – Harper and Row Publications.
4. Research Methodology – P.Saravanavel – Kitlab Mahal, Sixth Edition.
5. A Hand book of Methodology of Research – Rajammal P.A.Devadass - Vidyalaya Press.
6. Statistical methods – G.W. Snedecor and W.Cocharan – Oxford and IBH, New Delhi.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED PHYSICS	Exam Hrs.	3
		MPH8PY02	

Course Learning Outcomes:

On completion of the course the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

➢ explain the relativistic quantum mechanical equations, namely, Klein-Gordon equation and Dirac equation

➢ describe second quantization and related concepts.

➢ explain the formalism of relativistic quantum field theory.

➢ Understands the quark, the strong nuclear force, and the underlying symmetries

➢ Students will understand the types of problems that may be solved using Monte Carlo and Molecular Dynamics, and those where these methods are ineffective

➢ Students will develop insights into typical considerations needed in a computational physics project, including parameter space exploration, estimation of run time, etc

➢ Classify solid state matter according to their band gaps.

➢ Understand how electrons and holes behave in semiconductors, and explain how they conduct current.

➢ Explain and give simple models for Schottky and PN-junctions.

➢ Impart knowledge on Onsager, Debye equation and calculate dielectric relaxation time and to draw the plane diagram using Cole-Cole, Cole-Davidson plots.

➢ be able to outline the importance of solid-state physics in the modern society.

UNIT-I: QUANTUM MECHANICS

Second quantization of schrodinger and Klein-Gordon fields- Creation and annihilation operators – Commutation relations – Second quatization of Dirac field – Covariant and anti-commutation relations for Dirac field.

UNIT-II: NUCLEAR AND PARTICLE PHYSICS

Compound nucleus and statistical theory – Experimental evidence – Statistical assumption – Average cross section – Angular distribution – Transmission coefficients – Level density – Decay of the statistical compound nucleus – Emission of charged particles. Symmetries and conservation laws – Gell Mann Nishijima formula – CPT invariance – Quark model.

UNIT-III: NON-LINEAR AND MOLECULAR MECHANICS

Basics of nonlinearity – Linear and nonlinear oscillators – Autonomous and non-autonomous system – Dynamical system.

The energy calculations – Energy minimization – Force field paramertization – Conformation analysis – Solvation – Montecarlo methods – Molecular dynamics – Free energy calculation.

UNIT-IV: SOLID STATE PHYSICS-I

Band structure theory – Band structure for some semiconductors – Semiconductor transport theory – Basics of continuity equation – Theory of generation and recombination – Theory of PN junction – PN junction solar cells – ionic conductivity – Normal and super ionic conductors – Application of super ionic solids: Battery, Fuel cells, Electrochromic display.

UNIT-V: SOLID STATE PHYSICS-II

Basic concepts of dielectrics: Static fields- Time dependent fields- Static dielectric constant: Dipolar interaction - Dipolar molecules in gases and dilute solutions- Onsager equation-Debye equations- Dielectric relaxation and loss-Distribution of relaxation time – Complex plane diagrams-Cole-Cole, Cole-Davidson plots.

REFERENCE BOOKS:

1. Advanced Quantum Mechanics – B.S. Rajput- Pragathi Praksan
2. Physics of the Nucleus – M.A.Preston – Addision – Wesley
3. Elementary particles – D.Griffiths.
4. Nonlinear dynamics – M.Lakshmanan and S.Rajasekar – Springer International.
5. Computational Chemistry – Guy H.Grant and W.Graham Richards –Oxford University press.
6. Semiconductor Devices –S.M.Sze.
7. Electronic properties of materials – Rolf E. Hummel –Springer.

8. Super ionic solids – S.Chandra – North Holland Publishing Company Ltd.
9. Theory of Dielectric – H.Frohlich- Oxford University press.
10. Theory of electric polarization Vol.I and Vol.II – C.J.F. Botcher – Elsevier scientific publication.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8CH01	

COURSE OUTCOME :

CO1: Justifies research and identifies areas of research based on ethical issues.

CO2: Able to design the research work by selecting a suitable problem.

CO3: Learns the methods the data collection and the techniques of data presentation.

CO4: Able to carry out the error analysis and also design methods to control error.

CO5: Learns how to write a research paper and thesis.

UNIT-I: RESEARCH METHODOLOGY

Meaning of research − Objectives of research - motivation of research − Types, approaches and significance − Methods versus methodology − Research in scientific methods − Research process − Criteria for good research − Problem encountered by research in India − Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT-II: RESEARCH DESIGN

Research Problem: Selecting the problem − Necessity of defining the problem − Techniques involved in defining the problem − Research design − Needs and features of good design − Different research design − Basic principles of experimental designs.

UNIT-III: DATA COLLECTION AND DOCUMENTATION

Data collection methods − Data types − Processing and presentation of data − Techniques of ordering data − Meaning of primary and secondary data − The uses of computers in research − The library and Internet − Uses of search engines − virtual libraries − common software for documentation and presentation.

UNIT-IV: DATA AND ERROR ANALYSIS

Statistical analysis of data − Standard deviation − Correlation − Comparison of set of data − Chi squared analysis for data − Characteristics of probability distribution − Binomial, Poisson

and normal distribution – Principle of least square fittings – Curve Fitting – Measurement of errors – Types and sources errors – Determination and Control of errors.

UNIT-V: RESEARCH COMMUNICATION

Meaning of research report – Logical format for writing thesis and paper – Essential of Scientific report: abstract, introduction, review of literature, materials and methods and discussion – Write up steps in drafting report – Effective Illustrations tables and figures – Reference styles: Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research Methodology, Methods and Techniques – C.R Kothari – Wishwa
Prakasam Publications, II Edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research: An introduction – Robert Ross – Harper and Row Publications.
4. Research methodology – P. Saravanavel – Kitlab Mahal, Sixth Edition.
5. A Hand book of Methodology of Research – Rajammal P.A. Devadass Vidyalaya Press.
6. Introduction to Computers – N. Subramanian
7. Statistical methods – G.W Snedecor and W. Cocharan – Oxford and IBH, New Delhi.
8. Research Methodology Methods and Statistical Techniques – Santosh Gupta.
9. Statistical Methods – S.P Gupta
10. Scientific social surveys and research – P.Young – Asia Publishers, Bombay.
11. How to write and publish a scientific paper – R.A Day – Cambridge CollegePress.
12. Thesis and Assignment writing – Anderson – Wiley Eastern Ltd.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED CHEMICAL ANALYSIS	Exam Hrs.	3
		MPH8CH02	

COURSE OUTCOME :

CO1: Gains knowledge on the principle and functioning of various instruments used in analytical chemistry.

CO2: Learns the principle of various spectroscopic techniques and apply them in the structural elucidation.

CO3: Gains knowledge on the applications of spectroscopy in chemistry.

CO4: Able to elucidate the structure of Organic and Inorganic molecules by correlating the data from various spectroscopic techniques.

CO5: Learns the application of spectroscopy in stereochemistry.

UNIT-I

Instrumental methods of analysis: Atomic absorption and emission spectroscopy chromatography including GC and HPLC and electro-analytical methods (Colorimetry, cyclic voltammetry, polarography, amperometry, and ion selective electrodes).

UNIT-II

Spectroscopy: Principle and applications in structure elucidation:

(i)   Rotational Diatomic molecules; isotopic substitution and rotational constants.

(ii)   Vibrational: Diatomic molecules, linear tritomic molecules, specific frequencies of functional groups in polyatomic molecules.

(iii)   Electronic: Singlet and triplet states; n p* and P P* transitions; application to conjugated double bonds and conjugated carbonyls – Woodward-Fieser rules; Change transfer spectra.

(iv)   Nuclear Magnetic Resonance (IH NMR): Basic principle; chemical shift and spin-spin interation and coupling constant.

(v)   Mass Spectrometry: Parent peak, base peak, metastable peak, Mclafferty rearrangement.

UNIT-III

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of organic molecules.

UNIT-IV

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of inorganic molecules.

UNIT-V

Symmetry elements: point groups; (ii) optical activity its origin, atomic and conformation asymmetry; (iii) Variation of optical activity with wave length. Optical rotatory dispersion and circular dichroism curves and their application, in determining the configuration and conformation of different compounds (iv) conformational analysis.

REFERENCE BOOKS:

1. H.H. Willand, L.L Merrit and j.A.Dean, Instrumental Methods of Analysis –D. Ven. Nostround Co.
 2. H.A. Stobel, Chemical Instrumentalism – Addition – Wesley Publishing Co.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8BI01	

Course outcome:

By the end of the course students will be able to:

COs	Sub Code :**P8BI3001**	Subject:**Molecular Endocrinology**
CO1	Understand the basic principles, types, methods and strategies of isolation, separation, purification and characterization of biological molecules.	
CO2	Correlate various analytical techniques in biochemistry.	
CO3	Acquire problem solving and troubleshooting skills in analytical techniques in biochemistry.	
CO4	Demonstrate methods, instrumentation and applications of chromatographic and electrophoretic methods.	
CO5	Understand the principles, methods, instrumentation and applications of spectroscopic and radio isotopic techniques.	
CO6	Apply immunological techniques for analytical purpose.	

Objectives:

The objective is to educate the students on the basic research, research design, and principle in scientific research, data collection and analysis of significance data.

UNIT - I RESEARCH METHODOLOGY

Meaning of research –Objectives of research –motivation of research- Types, approaches and significance-Methods versus methodology – Research in scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT - II RESEARCH DESIGN

Research problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design- Needs and features of good design – Different research design- Basic principles of experimental designs.

UNIT III – DATA COLLECTION AND DOCUMENTATION

Data collection methods- Data types- Processing and presentation of data- Techniques of ordering data-Meaning of primary and secondary data-The uses of computers in research-The library and internet-Uses of search engines-virtual libraries – common software for documentation and presentation.

UNIT IV – DATA AND ERROR ANALYSIS

Statistical analysis of data-Standard deviation-Correlation-Comparison of sets of data-Chi square analysis of data-Characteristics of Probability distribution-Binomial, Poisson and normal distribution- Principle of least square fittings- Curve fitting-Measurement of Errors-Types and sources of errors- Determination and control of errors.

UNIT V – RESEARCH COMMUNICATION

Meaning of research report – logical format for writing thesis and paper- Essential of scientific report- Abstract, Introduction, Review of literature. Materials and methods and discussion- Write up steps in drafting report- Effective illustrations; Tables and figures – Reference styles; Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research methodology, Methods and techniques- C.R.Kothari-Vishwapragasam Publications, 2nd edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research ; An introduction – Robert Ross – Harper and Row Publications
4. Research methodology – P.Saravanavel – Kitlab mahal, 6th edition.
5. A hand book of methodology of Research – Rajammal P.A.Devadas-Vidhalaya press.
6. Introduction to computers – N.Subramanian
7. Statistical methods – G.W.Snedecor and W.Cocharan- Oxford and IBH, New Delhi
8. Research methodology methods and statistical techniques –Santhosh gupta.
9. Statistical methods- S.P.Gupta

10. Scientific social survey and research – P.Young –Asia publisher, Bombay.
11. How to write and publish a scientific paper – R.A.Day, Cambridge University Press.
12. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ANALYTICAL METHODS	Exam Hrs.	3
		MPH8BI02	

Course outcome:

By the end of the course students will be able to:

COs	Sub Code :**P8BI3001**	Subject:**Molecular Endocrinology**
CO1	Understand the fundamentals of research, research problems and methodology.	
CO2	Learn the principles of scientific research and research design.	
CO3	Acquire problem solving and troubleshooting skills in analytical techniques in biochemistry.	
CO4	Understand research design and research ethics.	
CO5	Learnresearch data collection, statistical methods and analysis.	
CO6	Develop research writing skills and thesis writing.	

Objectives:

The objective is to educate the students on the basic principles, instrumentation and applications of the analytical tools of biochemistry

UNIT I SEPARATION & CHROMATOGRAPHIC TECHNIQUES

Centrifuge techniques, Prepartive centrifugation,Density gradient, Analysis of subcellular fractions. Determination of molecular weight macromolecules ,Analytical ultra centrifugation.

Absorption chromatography , Partition chromatography , Ion exchange chromatography Exclusion chromatography, Affinity chromatography, HPLC, Application of these techniques.

UNIT II ELECTROPHORETIC & RADIO ISOTOPE TEHCNIQUES

General techniques, High voltage electrophoresis, Disc electrophoresis, Iso electric, focusing, Application of these techniques.

Nature of radio activity Detection and measurements of radioactivity ,Application in biological science, Safety Aspects.

UNIT III SPECTROSCOPIC TECHNIQUES

Basic principle, Spectrophotometry, Fluorometry, Flame photometry, ESR, NMR Mass Spec & Application of these techniques.

UNIT IV   MANOMETRIC & IMMUNOLOGICAL TECHNIQUES

Types of manometry, Warburgs constant volume, Oxygen electrode, Applications.

Introduction, Production of antisera and precipitation reaction, Precipitation in free solution, Precipitation in gel immuno diffusion, RIA, ELISA, Immuno fluorescence

UNIT V STATISTICAL METHODS

Basic concepts, Law of chance, probability, mean, SD, binomial expression, hardy Weinberg laws, Test analysis of variance, co-efficient of correlation.

Text Books:

1. Practical Biochemistry by K.Wilson and J.Walker. 5th edition Cambridge Univ 2005.
2. Introductory Practical Biochemistry (Narosa,2000) by K.Shawney & Randhir Singh.
3. Practical Biochemistry by Shawney

Reference:

1. Physical Biochemistry by David Friefielder, W.H.Freeman 2nd edition (1982)
2. Introduction to Medical Laboratory Techniques by Mukherjee, Volume I,II & III
3. Introduction to instrumental analysis by Robert D.Brown, Pharma Book Syndicate(2006)

PROGRAMME OUTCOMES (PO's): M.Phil. BIO-TECHNOLOGY

M.Phil. scholars will acquire the following spectrum of knowledge…

PO1 - Develop the understanding of Theory and Research

PO2 - Gain experience in Experimental or Case Study design, Scientific Data Analysis, Writing and communication, Ethical Practices and Effective Collaboration.

PO3 - Communicate effectively with scientific community and with Society at large.

PO4 - Comprehend and write effective report documentation.

PO5 - Effectively disseminate technical information using written progress report, strategic report, scientific communication and operations.

PROGRAMME SPECIFIC OUTCOMES (PSO's): M.Phil. BIOTECHNOLOGY

M.Phil. Biotechnology scholars will be able to

PSO1 - Understand the current state of Biotechnology in their area of specialization.

PSO2 - Formulate a hypothesis and conduct research using appropriate tools and techniques with in their focused area of Study.

PSO3 – Communicate research results in Written and Oral Format.

PSO4 - Effective Teaching and mentor of others.

PSO5 - Recognize the need for the preparation and ability to carry out an independence research in broadest context of Biotechnological relevance.

CO's	Sub Code: MPH8BT01	Subject: **RESEARCH METHODOLOGY**
CO1	Understand the objective and problems encountered by research in India	
CO2	To understand the responsibilities of researchers	
CO3	To study and understand the code of ethics involved in research	
CO4	Design the research problems, techniques and experimental design.	
CO5	Understand the technique of data collection and ordering for documentation and presentation.	
CO6	Apply the research data for statistical analysis	
CO7	Determine the measurement of errors and control of research data	
CO8	Logical format for writing thesis research report	
CO9	Draft reports based on the research data derived and effective illustration by tables and figures.	

CO's	Sub Code: MPH8BT02	Subject: **ADVANCED BIOTECHNOLOGY**
CO1	Strategize protocols for amenable gene transfer, vectors used in gene transfer in plants.	
CO2	Develop and characterize and maintenance of cell lines and production of human animal viral vaccines.	
CO3	Demonstrate, DNA based diseases diagnosis and stem cell biology and regenerative medicines	
CO4	Develop the knowledge of production of Bioactive compounds and recombinant vaccine.	
CO5	Demonstrate the knowledge of downstream processing of enzyme production	
CO6	Describe the biosensors, biofuel, biopolymers and the application of nanotechnology	
CO7	Analyse the solutions for industrial effluents, nuclear wastes and bioremediations.	

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8BT01	

UNIT- I RESEARCH METHODOLOGY

Meaning of research-Objectives of research-motivation of research- Types, approaches and significance-Methods versus methodology- Research in scientific methods- research process- Criteria for good research- Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT - II RESEARCH DESIGN

Research problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research designs- Needs and features of good design – Different research design – Basic principles of experimental designs.

UNIT- III DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types- Processing and presenting of data- Techniques of ordering data- Meaning of primary and secondary data- The uses of computers in research- The library and internet – uses of search engines – virtual libraries-common software for documentation and presentation.

UNIT - IV DATA AND ERROR ANALYSIS

Statistical analysis of data-Standard deviation-Correlation-comparison of sets of data-Chi square analysis of data-Characteristics of probability distribution-Binomial, Poisson and normal distribution- Principle of least square fittings- Curve fitting-Measurement of Errors – Types and source of errors- Determination and control of errors.

UNIT - V RESEARCH COMMUNICATION

Meaning of research report- logical format for writing thesis and paper – Essential of scientific report- Abstract, Introduction, Review of literature. Materials and methods and discussion- Write up steps in drafting report- Effective illustrations; Tables and figures - Reference styles; Harvard and Vancouver systems.

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2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research ; An introduction - Robert Ross – Harper and Row publications
4. Research methodology – P.Saravanavel – Kitlab mahal, 6th edition.
5. A hand book of methodology of research- Rajmmal P.A.Devadas- Vidhalaya press.
6. Introduction to computers – N.Subramanian
7. Statistical methods – G.W.Snedecor and W.Chcharan – Oxford and   IBH, New Delhi.
8. Research methodology methods and statistical techniques – Santhosh gupta.
9. Statistical methods – S.P.Gupta.
10. Scientific social survey and research – P.young – Asia publisher, Bombay
11. How to write and publish a scientific paper – R.A.Day, Cambridge University press.
12. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED BIOTECHNOLOGY	Exam Hrs.	3
		MPH8BT02	

UNIT - I Plant Biotechnology

In-vitro regeneration protocols amenable for gene transfer, Vectors used in gene transfer in plants. Ti plasmids, Biolistic gun. Antisense and RNAi strategies for metaboloic engineering . Transgenic crops for herbicide, pest and abiotic stress resistance. Terminator gene technology. Biosafety issues, IPR and Bioethics.

UNIT – II: Animal Biotechnology

Different cell culture techniques ; Development of cell lines; Characterization and maintenance of cell lines; cryopreservation, Cell cloning and selection; transfection and transformation of cells; Application of animal cell culture for in vitro testing of drugs; Applications of cell culture technology in production of human and animal viral vaccines. Transgenic animal models: gene knock-outs; Cre-lox systems-applications.

UNIT – III: Medical Biotechnology

Human health care, genetic disorder, gene therapy, Infectious diseases, DNA-based disease diagnosis, Stem cell biology: stem cell types- haematopoietic and embryonic-cord blood cells- regenerative medicines. Production of Bioactive Compounds, Drug delivery, Development of recombinant vaccines, Herbal medicine.

UNIT – IV: Industrial Biotechnology

Production of enzymes & organic acids, downstream processing, Solid state fermentation, Bioprocess monitoring, modeling and control, Biocatalysis & Biotransformation, Bioconversion of biomass, Biosensors, Biofuel- bioethanol and biohydrogen, Biopolymers. Principles and applications of Nano biotechnology.

UNIT – V: Environmental Biotechnology

Global environmental issues and biotechnological solutions. Treatment of industrial effluents- solid waste management- Management of nuclear waste. Bioremediation- *in situ* and *ex situ* bioremediation. Biodegradation of xenobiotics. Biomonitoring. Biodiversity conservation.

REFERENCES:

1. Sathyanarayana. (2010). Biotechnology, India.
2. Slater, A. Scot, N. and Fowler, M. (2007) Plant Biotechnology-the genetic manipulation of plants. Oxford press,
3. Watson,J.D; Gilman, M; Witkowshi,J and M.Zoller, 1992. Recombinant DNA, 2nd edition. Scientific American Books, W.H. Freeman and Co; New york, USA
4. Glick, B.R and J.J. Pasternak. 2005. Molecular Biotechnology- Principles and application of recombinant DNA, 3rd edition. ASM press. Washington, USA
5. Environmental Biotechnology, principles and applications, Bruce Rittman, Perry Mccarty, McGraw- Hill, 2nd edition, 2000.
6. Therapeutic Immunology, K. Frank Austen, Steven J. Burakoff, Fred.S.Rosen (2nd edi.) 2001.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	6
		MPH8CS01	

COURSE OUTCOME :

CO1:   Justifies research and identifies areas of research based on ethical issues.

CO2: Able to design the research work by selecting a suitable problem.

CO3: Learns the methods the data collection and the techniques of data presentation.

CO4: Able to carry out the error analysis and also design methods to control error.

CO5: Learns how to write a research paper and thesis.

UNIT-I

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process-Problem Identification & Formulation – Research Question – Investigation Question –Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance.

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT-II

Research Design: Concept and Importance in Research – Features of a good research design –Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches.

UNIT-III

Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval,

Ratio. -Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size.

UNIT-IV

Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish ? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

UNIT-V

Use of Encyclopedias, Research Guides, and Handbook: Academic Databases for Computer Science Discipline -Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism.

REFERENCES:

1. Donald Cooper & Pamela Schindler, "Business Research Methods", Tata McGraw Hill, 9th edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Alan Bryman & Emma Bell, "Business Research Methods", Oxford University Press.
4. C.R. Kothari, "Research Methodology: Methods and Techniques", New Age International Publishers.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	COMPUTER GRAPHICS AND IMAGE PROCESSING	Exam Hrs.	6
		MPH8CS02	

UNIT I

Scan conversion – lines, circles and Ellipses; Filling polygons and clipping algorithms:Scan Converting Lines, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Scan Converting Ellipses, Filling Polygons, edge data structure, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-Barsky.

UNIT II

Visible-Surface Determination:Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting)

Illumination and Shading:Illumination and Shading Models for Polygons, Reflectance properties of surfaces, Ambient, Specular and Diffuse reflections, Atmospheric attenutation, Phong's model, Gouraud shading.

UNIT III

Image Enhancement and Image Restoration

Image Enhancement in the Spatial Domain: Basic Gray Level Transformations, HistogramProcessing, Enhancement Using Arithmetic/Logic Operations, SpatialFiltering , Fuzzy sets for spatial filters – Image Enhancement in the Frequency Domain: Frequency Domain Filters – ImageRestoration: Model of Image Degradation/Restoration Process, Noise Models, Linear and non linearimage restoration techniques, Blind Deconvolution

UNIT IV

Multiresolution analysis and Image Compression

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Fast Wavelet Transforms,Lifting scheme. Image Compression: Fundamentals – Models – Elements of Information Theory –Error Free Compression – Lossy Compression-wavelet based image compression techniques –Compression standards-JPEG/MPEG, Video compression.

UNIT V

Image Segmentation and Description

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection,

Thresholding, Region Based Segmentation, Basic Morphological Algorithms, Morphological Water Sheds - Description: Boundary Descriptors, Regional Descriptors.

REFERENCES:

1. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education, 2003.
2. Farina Madita Dobrick, Jana Fischer. Lutz M. Hagen (Editors) Research Ethics in the Digital Age: Ethics for the Social Seicne and Humanities in Times of Mediatization and Digitization,Springer, 2018.
3. D. Hearn and M. Pauline Baker, Computer Graphics (C Version), Pearson Education, 2nd Edition, 2004.
4. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition, 1990.
5. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Pearson Education, ThirdEdition, 2008.6
6. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2006.
7. Rafael C.Gonzalez, Richard E.Woods, and Eddins, "Digital Image Processing Using MATLAB", Tata McGraw-Hill, Second Edition, 2009